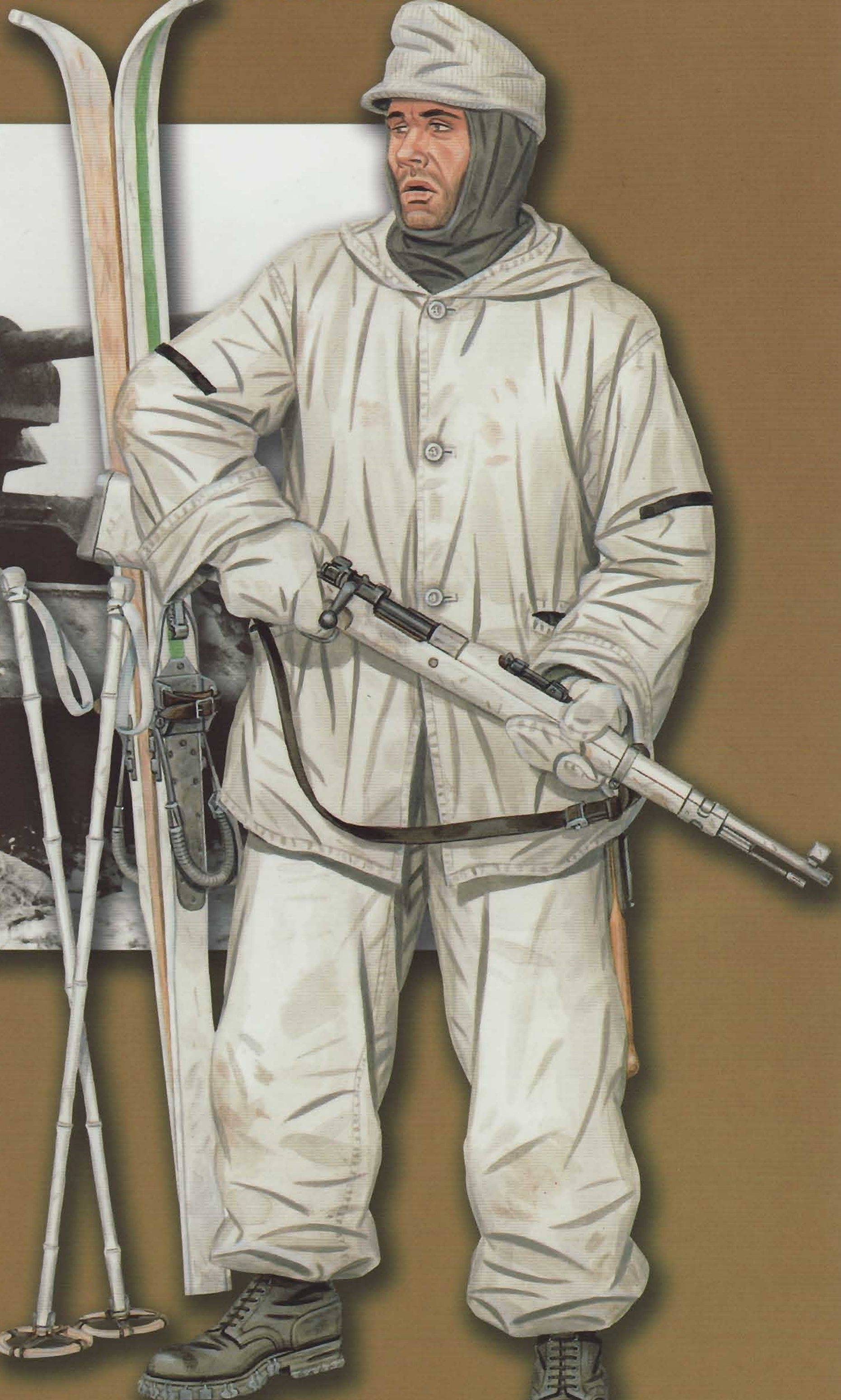
6523

White Hell

The German Army Faces the Russian Winter

Gordon Rottman & Stephen Andrew



CONCORD
PUBLICATIONS COMPANY

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B1, 10/F, Kong Nam Industrial Building
603-609 Castle Peak Road
Tsuen Wan, New Territories
Hong Kong
www.concord-publications.com

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ISBN 962-361-152-8
printed in Hong Kong

Introduction

Climate affects military operations regardless of the theater, but in Russia the weather had an extraordinary impact. The Russian winter drastically affected every aspect of military operations from the highest command echelons to the minutest details of the common Landser's everyday life. Tactics and doctrine had to be adjusted and new ones introduced at the strategic, operational, and tactical levels. Logistics, transportation, communications, medical treatment, and the employment of weapons were all affected. Weapons failed to operate properly, if at all, and their effects were reduced. Some types of vehicles were unusable in the snow and substitutes were necessary. Food, even the mere act of eating, was changed. Medical and sanitation considerations changed drastically. The extreme cold often caused more casualties than combat.

Every season presented challenges. In summer (Sommer), when the German invasion was launched on 22 June 1941, the USSR was hot, dry, and dusty. Clean water was often in short supply for men and the horses on which the German Army relied. Flies and mosquitoes spread disease, it was difficult to preserve food, and vehicle engines overheated and choked in the dust. Because the invasion began later than originally planned the Germans were soon campaigning in autumn (Herbst). With the milder temperatures came heavy rains. The Russians called them the rasputitza, the "big mud" or "quagmire season," a term picked up by the Germans. The term was applied to both the autumn and the spring mud. The Finns called it "rospuutto", meaning "roadlessness." All unpaved roads became rivers of mud. In the north autumn began in August, but it was not felt in the south until November. The average daily high temperatures were in the 50-60°F (10-15°C) range. The USSR, besides being the largest country in the world—covering 11 time zones east to west, some 5,600 miles (9,000 kilometers)—was also quite broad, over 1,000 miles (1,600 kilometers) from Leningrad to the Black Sea. No sooner does the autumn begin than the first stages of winter make themselves known. In fact, for all practical purposes much of Russia really has only two seasons, summer and winter. In the north the first snows of the brutal winter of 1941 fell on 12 September. In the south, the Stalingrad region, they fell in October. The spring (Frühling) is equally brief. Below freezing temperatures are experienced every night into May, but by June it is hot. The spring is accompanied by some rain and a great deal of mud, not from the rains, but caused by the extensive thaw. Streams became rivers overflowing their banks and frozen rivers that tanks could drive over turned into raging torrents that washed away pontoon bridges. More tanks on both sides were mired in the mud and abandoned than tanks lost in action. A surprising number of tanks attempting to skirt lakes crashed through hidden thinning ice. Teams of horses and oxen were necessary to pull trucks over roads which had turned into rivers of mud. Even full-tracked vehicles became mired on roads.

It is the Russian winter (Winter) on which we are concentrating. Essentially it lasts some seven months, from September/October to May. The coming winter crept southward across the USSR, bringing steadily decreasing temperatures. The winds blasted south and southeastward out of the Arctic Circle and later came from the east, roaring across Siberia. A large portion of the USSR was within the Arctic Circle. Moscow is on the same latitude as Canada's Hudson Bay. Temperatures were commonly at -20°F (-29°C). By January they are as low as -40°F (-40°C) and sometimes plunged to -60°F (-52°C). The blistering wind chill made it worse. Wind chill is the apparent temperature felt on exposed skin owing to a combination of air temperature and wind speed. The harder the wind the colder the apparent temperature. A 20 mph (32km/h) wind at 0°F (-18°C) is equivalent to -15°F (-26°C). Winds higher than 40mph (65km/h) have no significant additional chilling effect beyond that felt at that velocity. Blinding snowstorms blasted out of the east. Goggles were useless as they immediately iced up. Below 0°F (-18°C) through March and below freezing temperatures remain until May, which was considered the "spring."

German staffs at all echelons completely failed to consider the effects of the Russian winter and were extremely ill-prepared for what would happen to their forces on the Ostfront (Eastern Front). They failed to study the experiences of the French and Swedes fighting the Russians in winter and ignored their own experiences in World War I. They sought no advice from the Finns in regards to the very recent example of the 1939-40 Winter War, when the winter worked against the Soviets. The Germans were caught up in the Western European notion of war in which active campaigning was mutually halted in the winter. When it became obvious that they would not conquer the USSR before winter set in, they planned to withdraw two-thirds of their divisions leaving only a very thin fortified line until the final offensive was resumed in the spring. The Soviets were determined to follow the traditional Russian military practice of launching offensives in winter.

Under such low temperatures weapons and equipment failed to function properly, if they functioned at all. Vehicle and aircraft engines froze, as did their oil and coolants. Different types of metal used in engines expanded and contracted in the extreme cold at different rates and simply did not operate. Pans and large tins filled with petrol were burned beneath engines to thaw them out. Insulating materials such as layers of canvas and thick reed mats were lashed over engine hoods to retain heat. Vehicle tires and tracks would even freeze to the ground. So much wind-blown snow would collect beneath vehicles that they had to be dug out, taking care not to damage engines, oil pans and exhaust pipes. Horse-drawn sleds of all sorts replaced trucks, wagons, and carts. Infantrymen even used small children's sleds to haul ammunition. Steam locomotives, with water lines and tenders filled with water froze solid and nothing could be done to thaw them out. Motorcycles and bicycles, so useful in normal conditions, were of only limited use on frozen solid roads. They were replaced by snow skis and snowshoes. Special Winterkraftstoff (winter motor fuel) was issued that was completely free of water to prevent carburetors from freezing.

Weapons also suffered in the extreme cold. Critical components cracked, firing pins broke, bolts, breech blocks, and actions froze. Optical sights fogged up or froze. Ammunition priming froze, propellant simply failed to detonate or created dangerously high pressures and caused erratic ranges. The effects of artillery and mortar shells, and grenades were muffled in the snow and mud. The filler in smoke shells and grenades only smoldered or failed to burn at all. Antitank and antipersonnel mines froze solid or were so deeply buried by snow that in either case a tank or soldier failed to detonate them. Tripwires were also buried. In the spring thaw entire minefields were washed away with armed mines ending up considerable distances away, sometimes washed into and scattered among friendly positions. When taken into sheltering bunkers small arms long exposed to outdoor temperatures condensated and optical sights and binoculars fogged up. The same occurred when they were again taken outdoors. If the condensation was not cleaned off they would freeze outdoors. The same happened to weapons which had collected ice. When fired, if they functioned at all, the ice would melt, flow into crevices and then freeze, making the weapon completely inoperable. Soldiers learnt that the only quick way to free them of ice was to urinate on the actions of frozen weapons. Water-filled jackets of machine guns froze solid. The Germans learned that the oil of sunflower seeds, plentiful in Russia, resisted freezing and was a suitable weapons lubricant. They also adopted the Russian practice of mixing standard weapons lubricant oil and grease with a small amount of gasoline to prevent freezing.

Fighting positions and other defensive works were affected by the weather too. Open fighting positions could not simply be dug in the conventional manner. Instead, small fighting bunkers that provided protection from the wind were necessary. These would be manned by a few men who would rotate through half-hour to two hour watches. One-hour shifts were standard practice. This depended on the type of available protective clothing and the current weather conditions. This went on day and night, day after day with no lengthy periods of sleep. To the rear of the forward fighting bunkers were living bunkers. These contained gasoline or wood stoves, bunks, and tables. These positions had to be dug into frozen ground. The freeze line may have reached several feet down, even deeper later in the winter. This required a massive work effort and often explosives had to be used to blast holes and then to shovel out the spoil and square them off with hand tools. A great deal of timber had to be cut and hauled to the positions. The snow was so deep that trenches dug into the ground, even if dug before the ground froze solid, were filled and became useless because the snow piled too high for them to be viable. New trenches had to be cut into the snow. Frozen snow and ice blocks provided ample protection from gunfire. During the spring thaw trenches, bunkers, gun positions, and other fighting positions had to be continuously rebuilt and repositioned as some areas became inundated with mud. Barbed wire barriers and antitank obstacles were buried in snow and to be effective had to be recovered, relocated, and rebuilt. Rivers, lakes, swamps, and boulder fields which had provided natural obstacles were now crossable by the enemy.

The troops suffered immeasurably. In 1941 the German armed forces were outfitted only for the relatively mild Western European winter. The standard German field uniform was woolen, but as the war dragged on the uniform fabric was made with increasingly high rayon content, reducing its warmth. The same applied to the woolen greatcoat. On campaign soldiers did not carry a second field uniform, only an off-white or reed green cotton denim work uniform. By the onset of winter many woolen trousers were worn out and with few replacements available soldiers were forced to wear only the thin denim trousers. Two-piece long woolen underwear was issued along with woolen knitted gloves, sweaters, and scarves, but these were totally inadequate for the Russian winter. There were some protective suits available, but these were for specialist personnel such as motorcycle drivers and were not available to the rank-and-file. No sleeping bags were issued, only two, sometimes three, wool blankets. Mountain troops had somewhat better protective clothing, but found that it too was inadequate for the plunging temperatures. Because of the lack of planning, when the inadequate available winter clothing was finally shipped it required weeks to get to the already frozen front. There were no snow camouflage suits. Often units used commandeered bed sheets to make capes, helmet covers, and to conceal crew-served weapons. Some units fabricated crude snow camouflage outfits using local labor. Soviet insulated winter clothing, sheepskin coats, fur caps, gloves, mittens, felt boots, and other winter clothing were desperately looted from the dead of both sides. A winter clothing drive was instituted by Hermann Göring, but too late to be of much use. A great deal of winter clothing, including women's winter wear, was donated, but much of it was of little use, impractical, and did not arrive until near the end of winter.

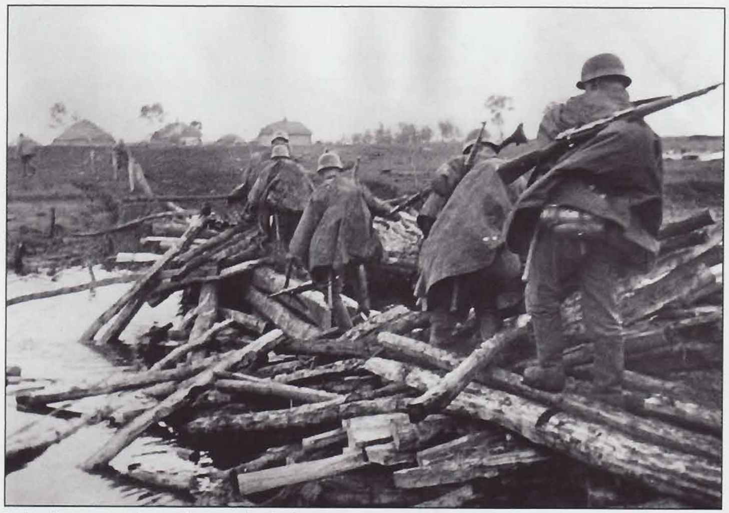
The wounded froze to death lying immobilized. Hands froze to weapons. An anti-frostbite cream was developed to apply to the exposed faces of sentries, but this was often in short supply. Steel helmets offered no protection from the cold and the tops of ears would freeze to the inside of the helmet. Straw and newspaper would be stuffed in boots and uniforms lined with layers of newspaper. Soldiers on guard would carry a ration tin filled with small rocks heated in the bunker stove and replaced by comrades to keep their fingers from freezing. Frostbite, if not immediately treated, would lead to gangrene. Many soldiers lost fingers, toes, hands, and feet to the necessary amputations. Wounds and fractures too would freeze and if gangrene set in on the torso or head they were doomed. To expose oneself to urinate invited frostbite and soldiers protected themselves with a rag. These were used over and over with no opportunity for washing. Clothing and quarters were infested with lice, which the Landser called "kleine Partisanen" (little partisans) or "Motschuppe" (motorized dandruff). Lice and snipers, "Läuse und Scharfschützen", were considered the two worst things in Russia, besides the weather. In fact there was no opportunity to wash any clothing or ever change underwear and socks. To defecate was an ordeal and also invited frostbite if a suitable place could not be found out of the wind. Some soldiers resisted the effort and became severely constipated.

That first Russian winter of 1941/42 was nearly disastrous and the troops suffered mightily. Over a quarter of a million men suffered from frostbite that winter and there were other illnesses including trench foot, dysentery, and stomach ailments, which also took their toll. That first winter was historically one of the worst in many years and each subsequent winter was even more brutal. Food was inadequate. Besides needing high calorie food for work and combat, more calories were needed just to stay warm. Every effort was made to provide the troops at least two hot meals a day, but the rations were often frozen by the time they were carried from field kitchens to frontline positions.

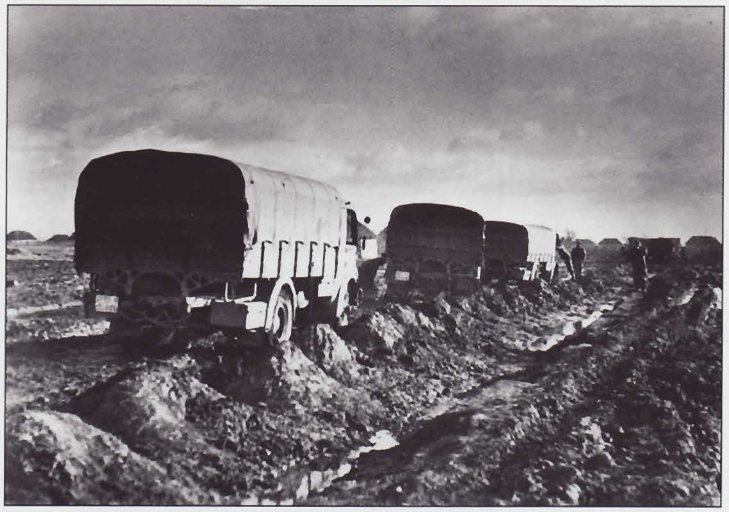
The first winter was so devastating that troops were granted the Medaille Winterschlacht im Osten 1941/42 (Winter Battle Medal in the East 1941/42), which was simply shortened to Ostmedaille (East Medal). The Landser who suffered through that bitter winter had their own names for it: Gefrierfleischorden (Frozen Meat Order), Hackfleischmedaille (Mincemeat Medal), and Eisbeinorden (Ice-leg Order). It was instituted in May 1942 for soldiers serving between 15 November 1941 and 15 April 1942. Combat troops had to have served at least 14 days and service troops at least 60.

The Germans were better prepared for the winter of 1942/43. A new and quite popular reversible insulated winter suit was issued. It was white on one side and a three-color camouflage pattern or medium gray on the other. It was issued with a close fitting hood that protected the neck and shoulders and could be worn under the helmet. Mittens were provided as were insulated gloves, insulated boots, windproof anorak jackets, toques (Balaclava helmets to insulate the head from the helmet), waistbands, and wristlets along with other winter gear. Several types of snow camouflage suits were provided. Ankle-length greatcoats made of animal hides with the fur on the inside were provided to sentries and drivers. Known as the Wachmantel (guard greatcoat), they were also called a "Steppmantel" (steppe greatcoat). Issue greatcoats were also lined with fur and extremely thick overboots made of woven straw were issued to sentries.

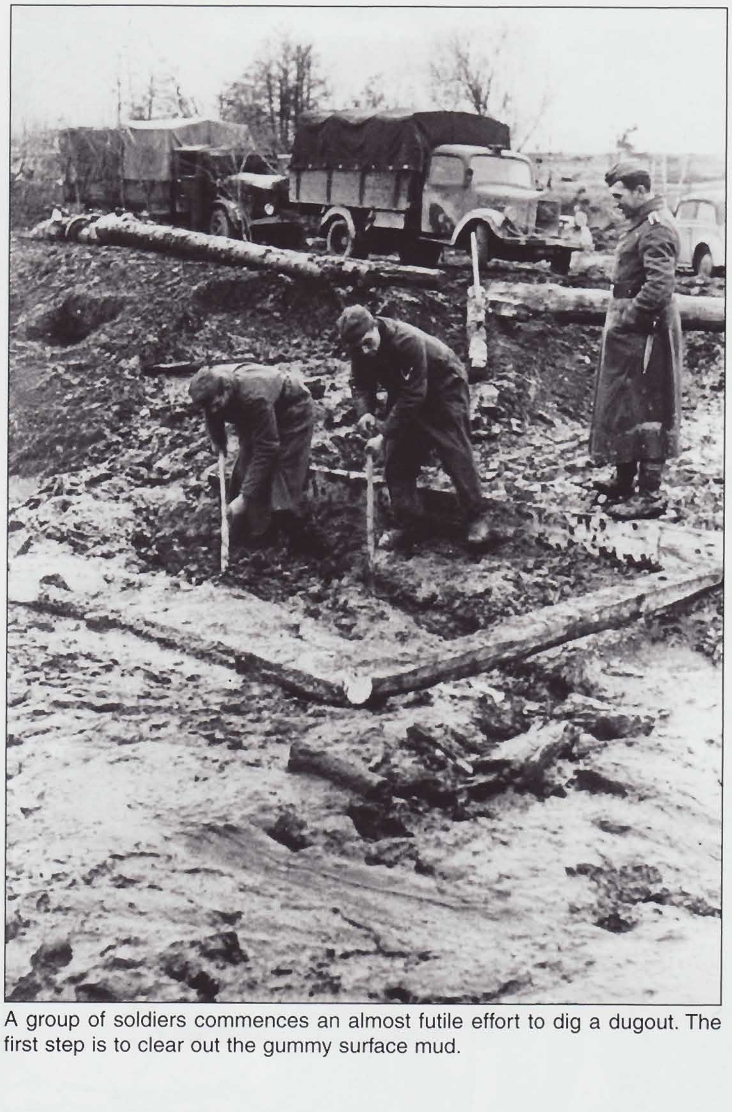
The German armed forces learned their lessons and improvised. Much had been learned from the Russians themselves. In August 1942 the German Army issued a 372-page winter warfare manual for the coming winter. The Landser fighting in Russia thought of himself as being in the Ostheer (Eastern Army), separate from the rest of the Army. Poorly supplied and supported, backed by little in the way of air support, dealing with constant shortages, and fighting a resolute and adaptable enemy that German propaganda continued to insist were sub-humans, he was slowly pushed back to the Fatherland and inevitable defeat.



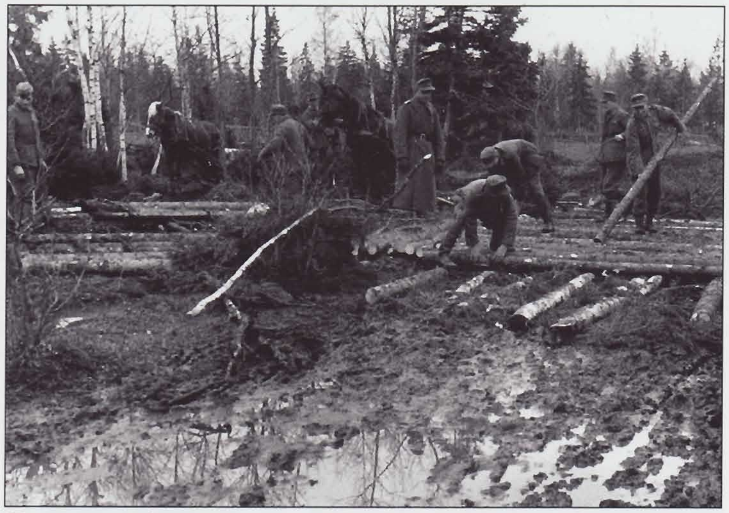
Infantrymen gingerly work their way across a crude, rapidly-built bridge of stacked timbers. It appears to have been severely damaged by artillery fire, making it impassable to vehicle traffic.



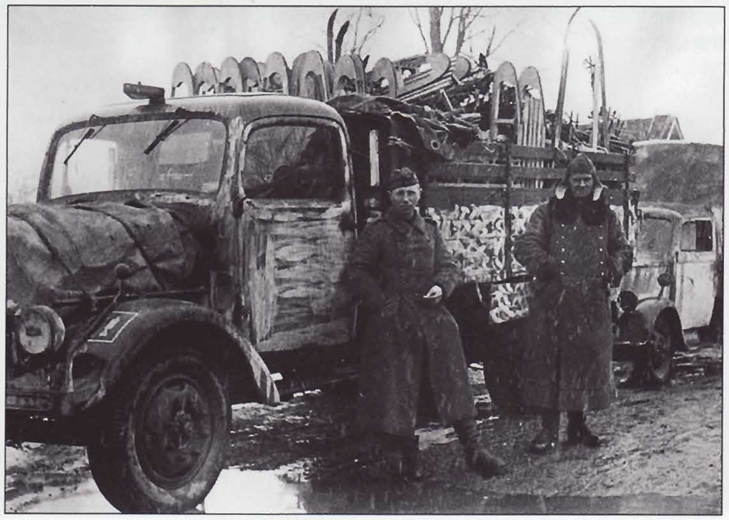
Cargo trucks haul supplies to the front. The mounds alongside the road are spoil from digging a drainage ditch for the spring flooding. The gaps between the mounds allow for drainage from the road's surface.



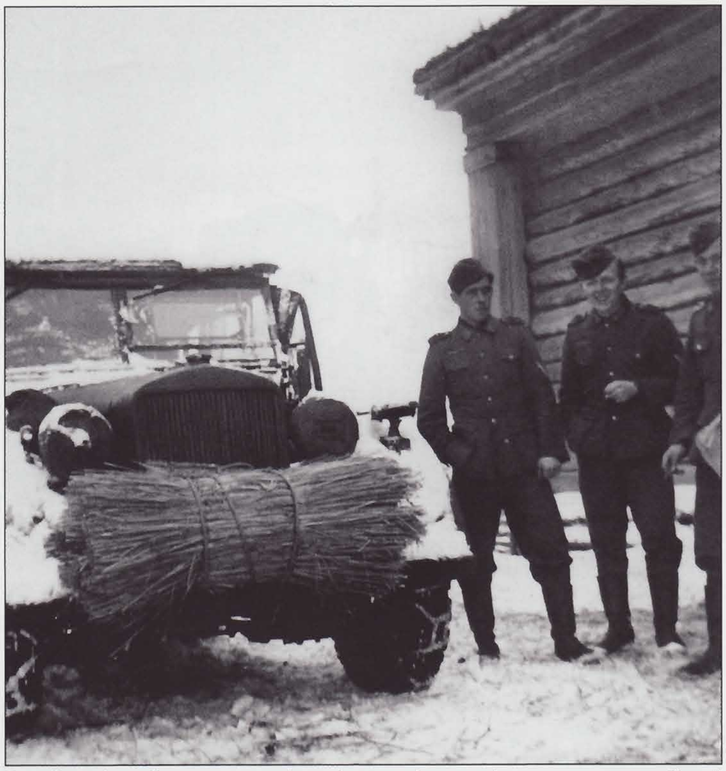
A group of soldiers commences an almost futile effort to dig a dugout. The first step is to clear out the gummy surface mud.



Pioneer troops lay a corduroy road through a marshy area. Only portions of roads really needing it were corduroyed owing to the amount of work necessary to fell, trim, move the trees to the road site, and emplace them. Five or six stringer logs were laid to support the road surface, more if the ground was extremely boggy. The road surface required a great number of six to eight-inch (150-200mm) diameter logs, nine to twelve per six feet (two meters). Then the chinks between logs had to be filled in with earth, gravel, bark, crushed twigs, etc. or the vibration would damage already road worn vehicles. Much additional effort went into maintaining corduroy roads as well.

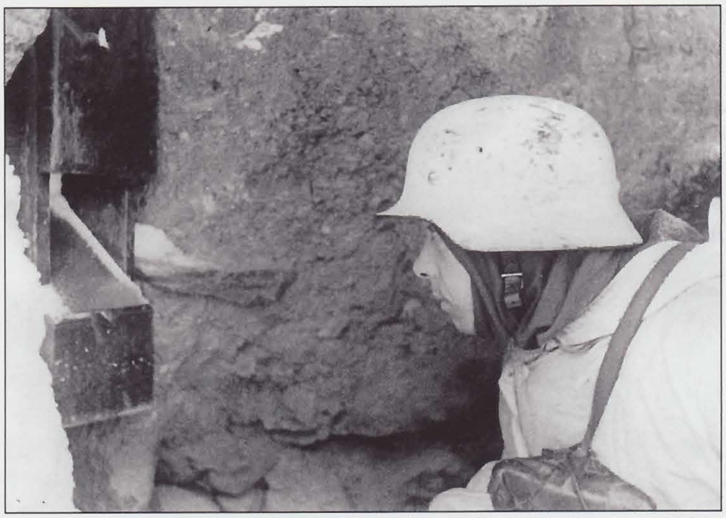


Even the hastily applied whitewash on this cargo truck was reasonably effective camouflage when it was parked among even sparse winter-bare vegetation or among buildings. According to the white tactical symbol on the right fender this truck belongs to a mountain artillery unit. It is transporting a load of small sleds, possibly made in a captured factory. These would be used to haul artillery ammunition and gun accessories. The hood has a doubled canvas tarpaulin lashed over it for insulation. This helps retain engine heat longer to make it easier to restart.



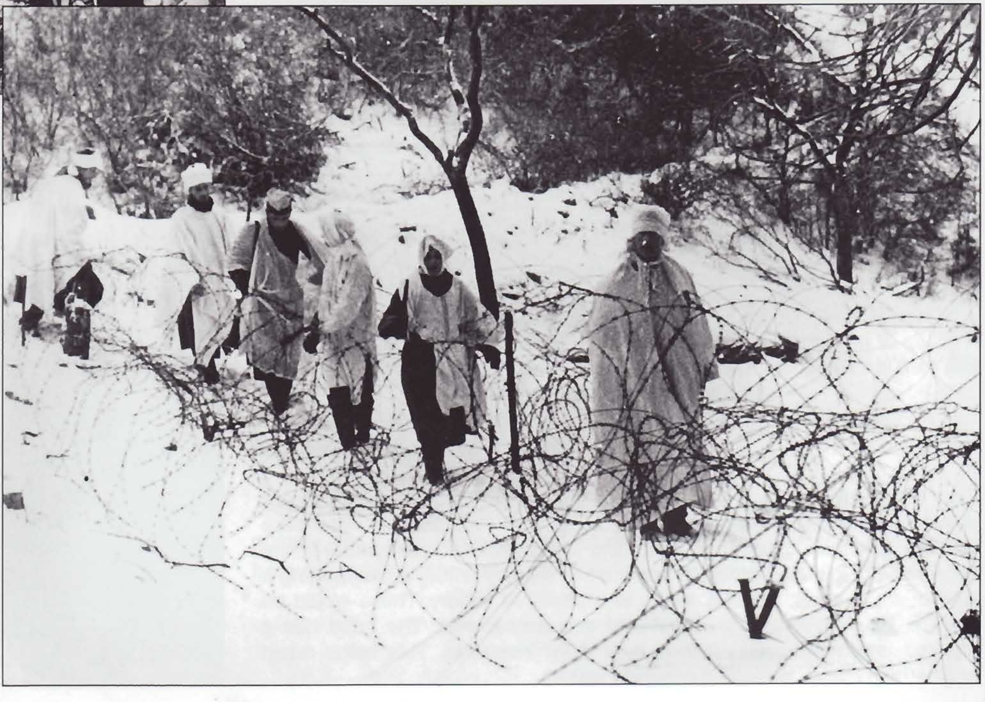
Bundles of reeds were sometimes fastened on trucks to serve as matting if they became stuck in loose snow. The same technique was used to combat the spring and autumn mud.

Unit officers question riflemen about their duties, assigned fields of fire, responses to specific events, and the like. This looks like a well fortified strongpoint incorporating buildings.

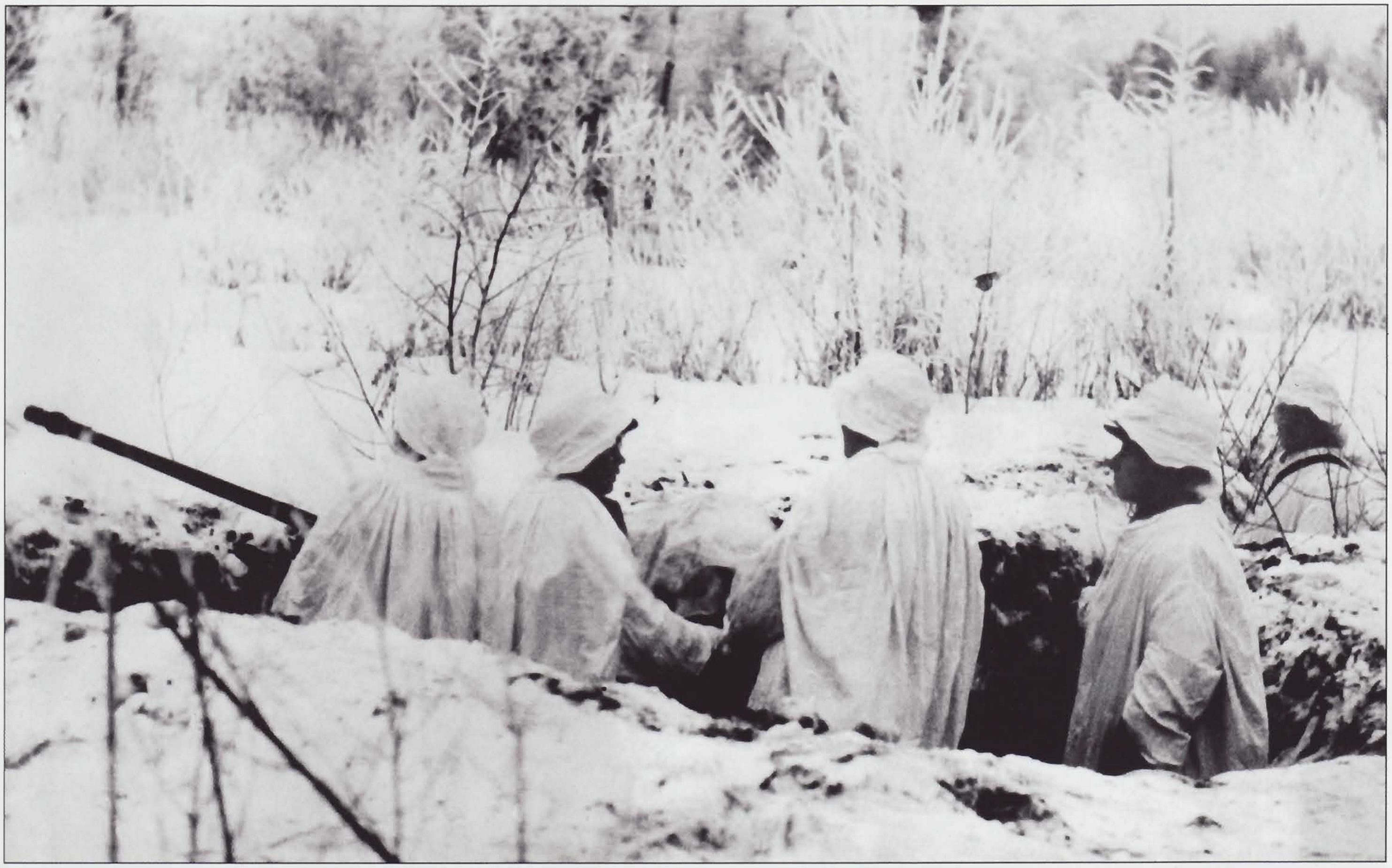


An observer peers through a homemade trench periscope to maintain surveillance on Soviet positions. Under such conditions troops on either side exposed themselves as little as possible owing to the danger of snipers. The mirrors of periscopes fogged up if one breathed on them, so this man keeps his distance.

Troops recover the body of a comrade. The disturbed surface snow, widely scattered equipment and items, and fallen sapling make it appear that mortar or artillery rounds inflicted the damage.

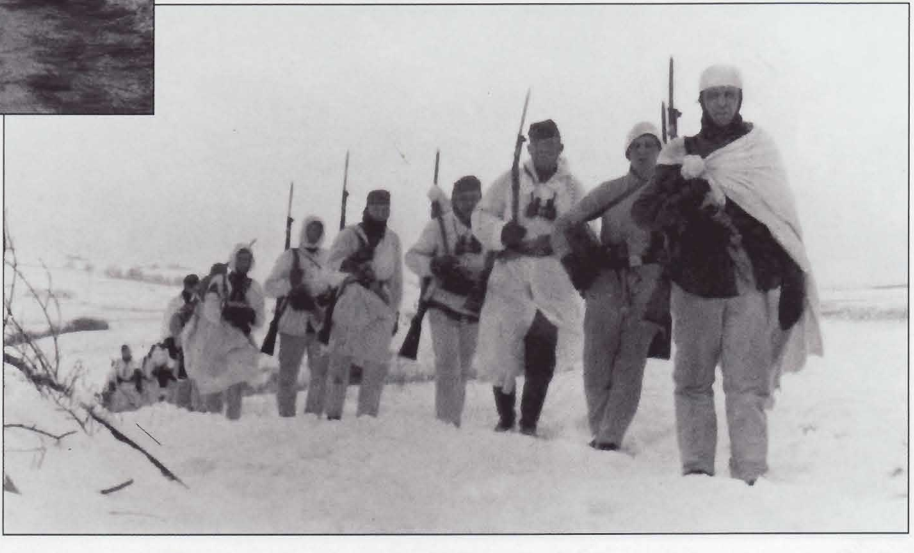


A local security patrol checks a concertina wire barrier. The coiled concertina wire was known as S-Rolle (Stacheldraht). The concertina is staked to the ground, but is not supported by picket posts. This makes it easy to mash flat by tossing logs on it or for soldiers to throw their bodies on it. Although this practice might expose them to fire, it was not as dangerous as it seems, provided men wore thick winter clothing and protected their faces with their arms. The patrol wears crudely fashioned snow suits made from linen bed sheets with torn cloth stripes wrapped around their headgear.



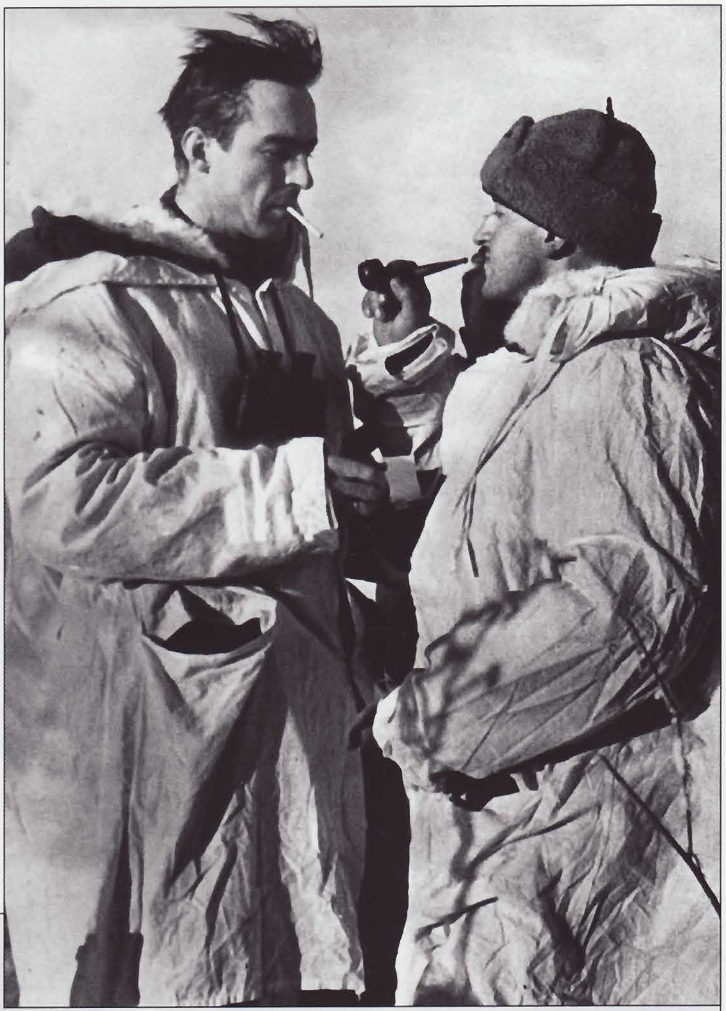
This 2cm Flak 30 antiaircraft gun is apparently dug in for reverse slope defense since it appears it cannot be depressed for horizontal firing. The reverse slope defense was often used as it protected the positions from direct observation and fire. Artillery and mortar fire against it would have to be guessed at as forward observers could not accurately adjust the rounds. Outposts and security would be placed on the forward slope. Attackers who crested the ridge were silhouetted to the defenders' fire and fully exposed as they charged down slope. Antiaircraft guns were also positioned on reverse slopes to prevent their detection until attacking aircraft flew over the ridge top.

Under normal conditions truck convoys halted for 10 minutes every hour for a break to allow the troops to stretch and warm up by moving about. Of course under emergency conditions rest halts could be few and far between. These troops wear the snow coveralls. While aiding in camouflage, the different types of suits sometimes restricted movement. Some were made too small, not allowing for all the clothing that would be worn beneath it.

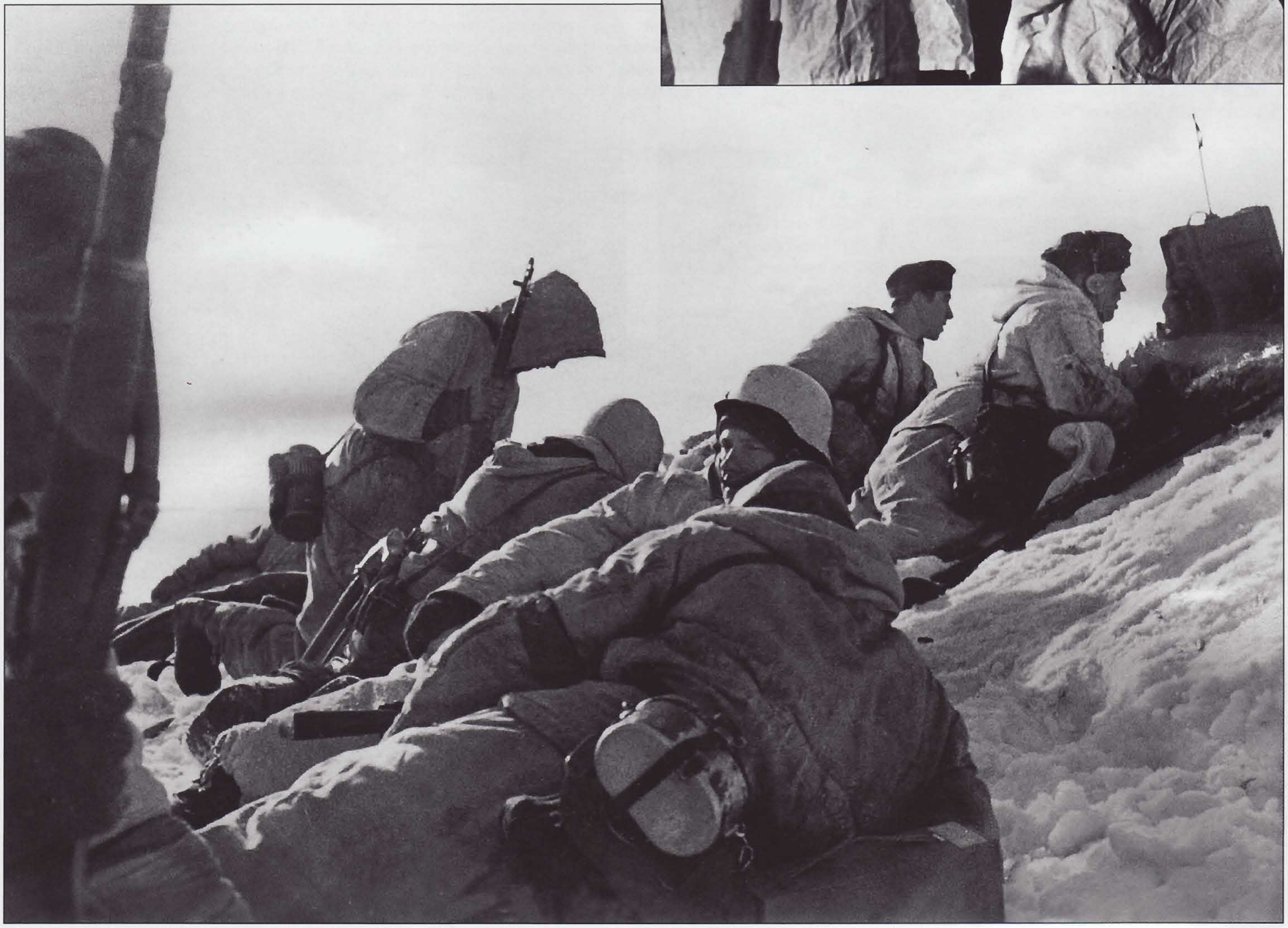


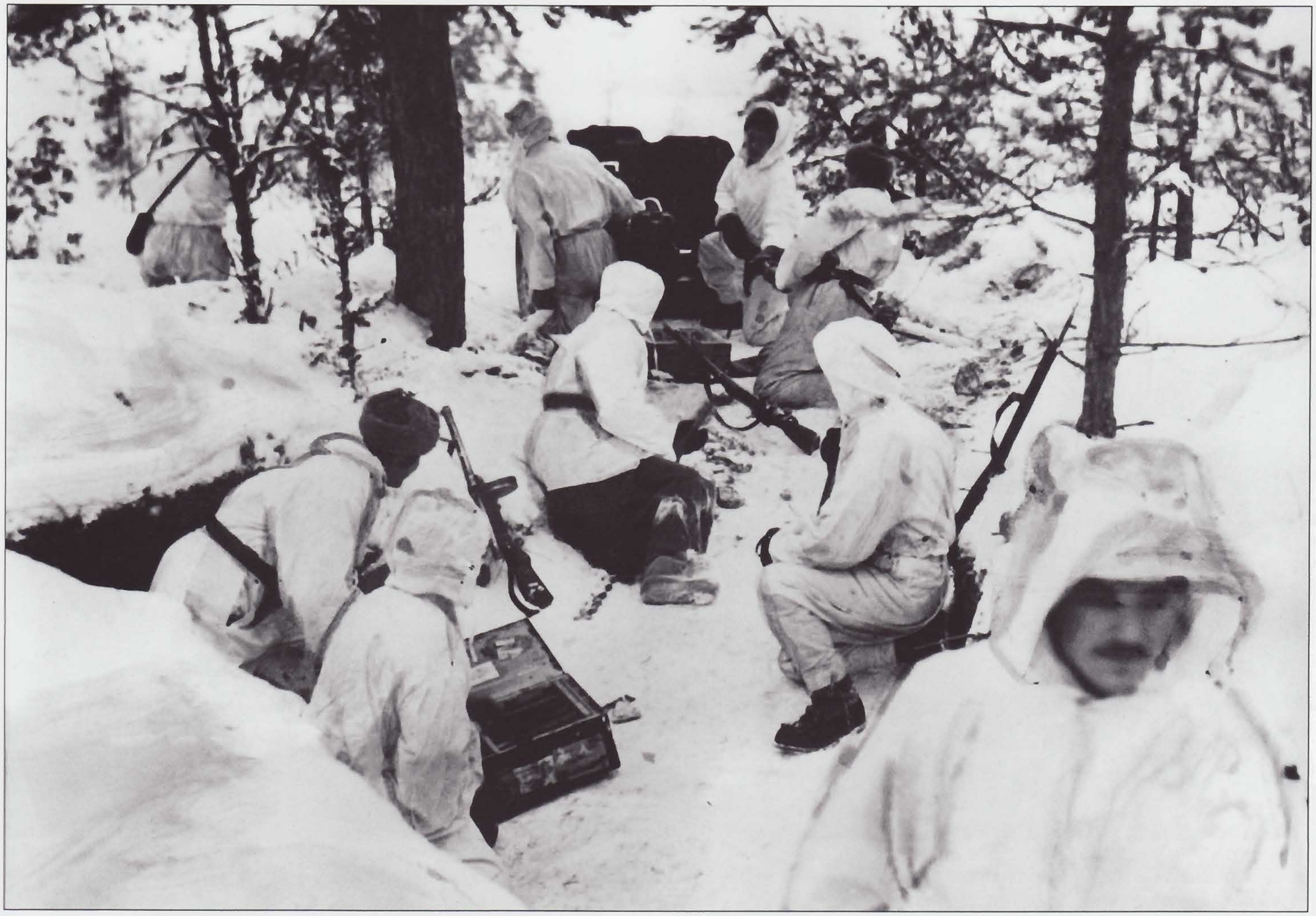
A rifle platoon moves up to the front wearing locally made snow camouflage outfits. Many of the men wear off-white denim drill trousers. Their woolen trousers had worn out by winter and without replacements they were forced to wear the one spare pair of trousers they possessed. The cotton denim was thin and offered next to no protection. Being off-white, it did not even provide effective snow camouflage.

Two officers light up a cigarette and a pipe. They wear the snow shirts (Schneehemden), pullover camouflage smocks. Several types of fur caps, influenced by the Soviet design, were issued. Captured Soviet fur caps were also widely used.

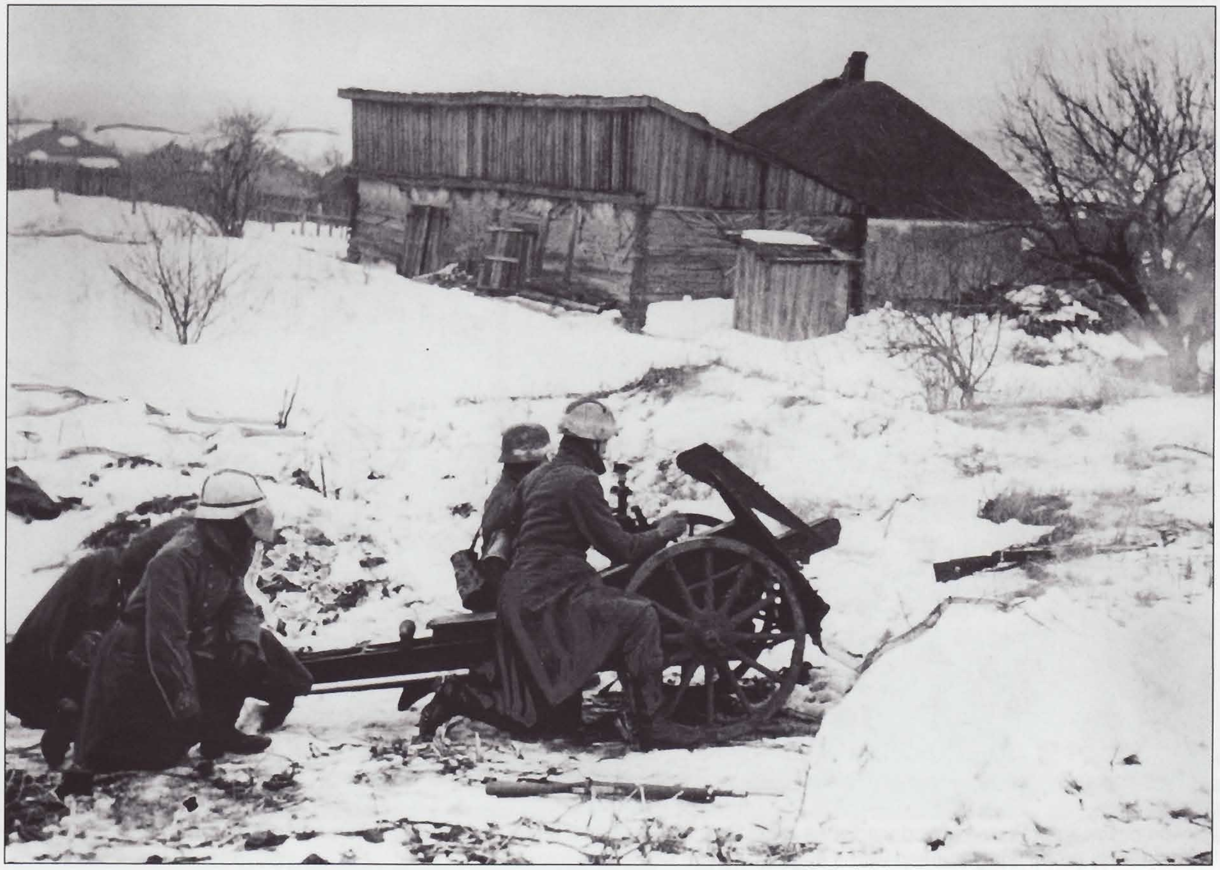


The command group of a Heer rifle company on a reverse slope of a low ridge. The radio operators with their Torn.Fu.d2 backpack radio can be seen at the upper right. They have scraped the snow down to bare ground for their resting place. The radio cannot be operated on the move. Some of the other men are no doubt company messengers, tasked to maintain contact with the platoons. Platoons did not have radios. One man in the left center is armed with a Soviet 7.62mm SVT semi-automatic rifle, which the Germans called a "Sl.Gew.259(r)". "Sl.Gew." means "Selbstladegewehr" (self-loading rifle). While not too rugged or reliable, many were pressed into German service, often one or two per squad.



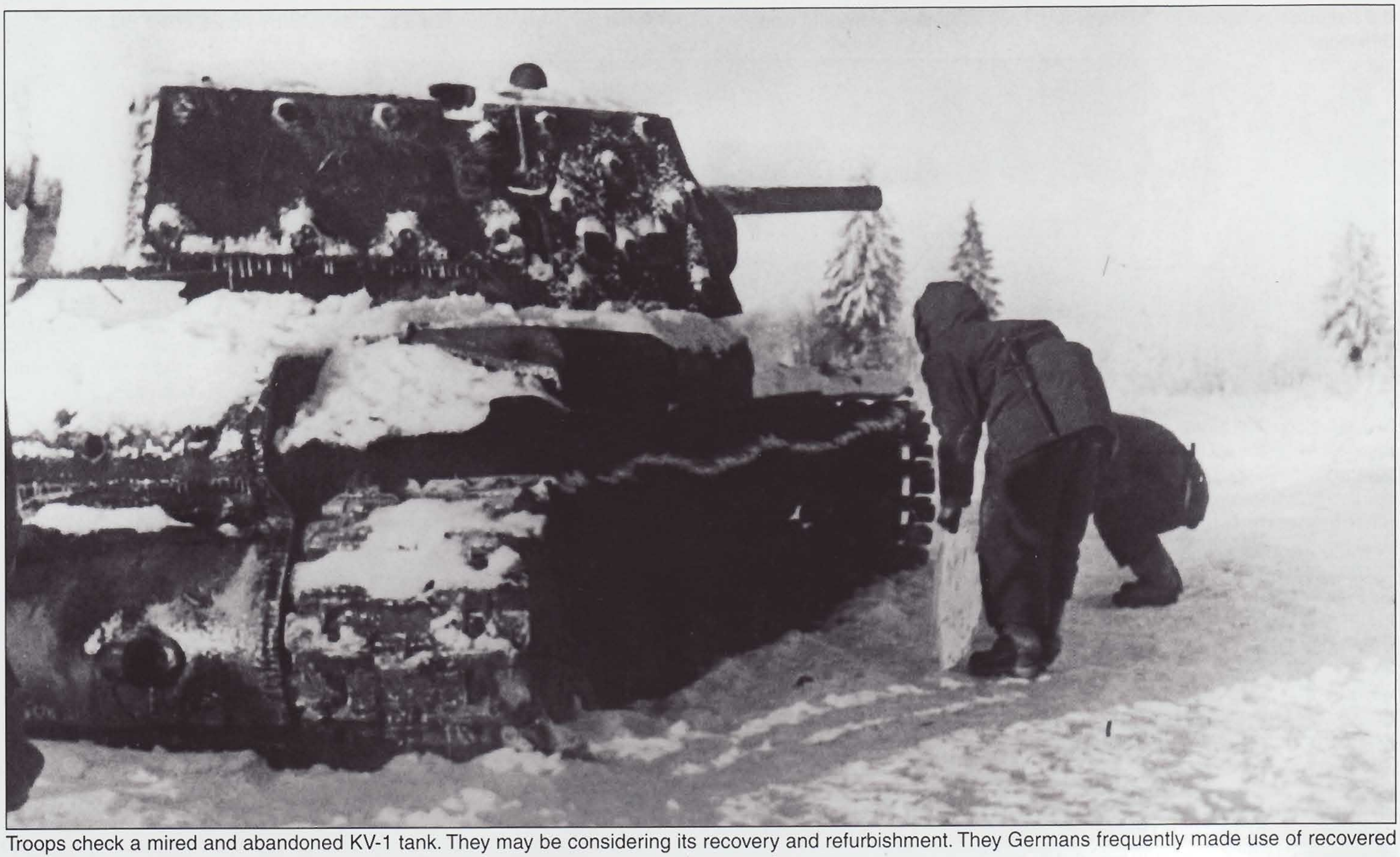


A 3.7cm Pak 35/36 antitank gun crew is prepared for action in its forest position. The ammunition handlers are lined up to pass rounds forward rapidly from the ammunition bunker in the lower left. They keep their individual weapons close at hand as they know that a sudden infantry attack could come from any direction.



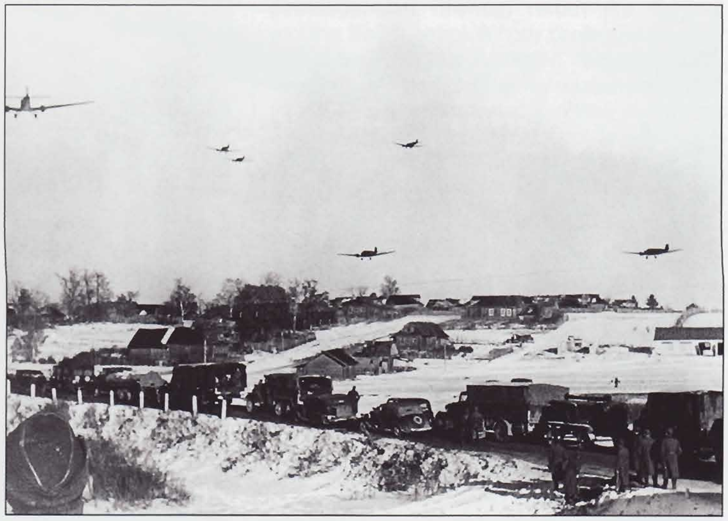
The crew of a 7.5cm l.IG18 light infantry gun ready the weapon for firing. The gun was disassembled for movement; it could be broken down into six packhorse loads. This version has wooden spoked wheels for horse-drawn or packhorse transport. There was also a version with pneumatic tires on steel disc wheels for motor transport towing. Six were normally assigned to an infantry regiment's infantry gun company. They operated either under regimental control or attached to a rifle battalion (two per battalion).

A patrol cautiously enters an abandoned Soviet position. Caution was necessary owing to the common presence of mines and booby traps and the threat of snipers, machine gunners, or mortars positioned to catch the unwary. Booby traps sometimes failed to function in severe winter condition owing to the firing or trip mechanisms freezing up.

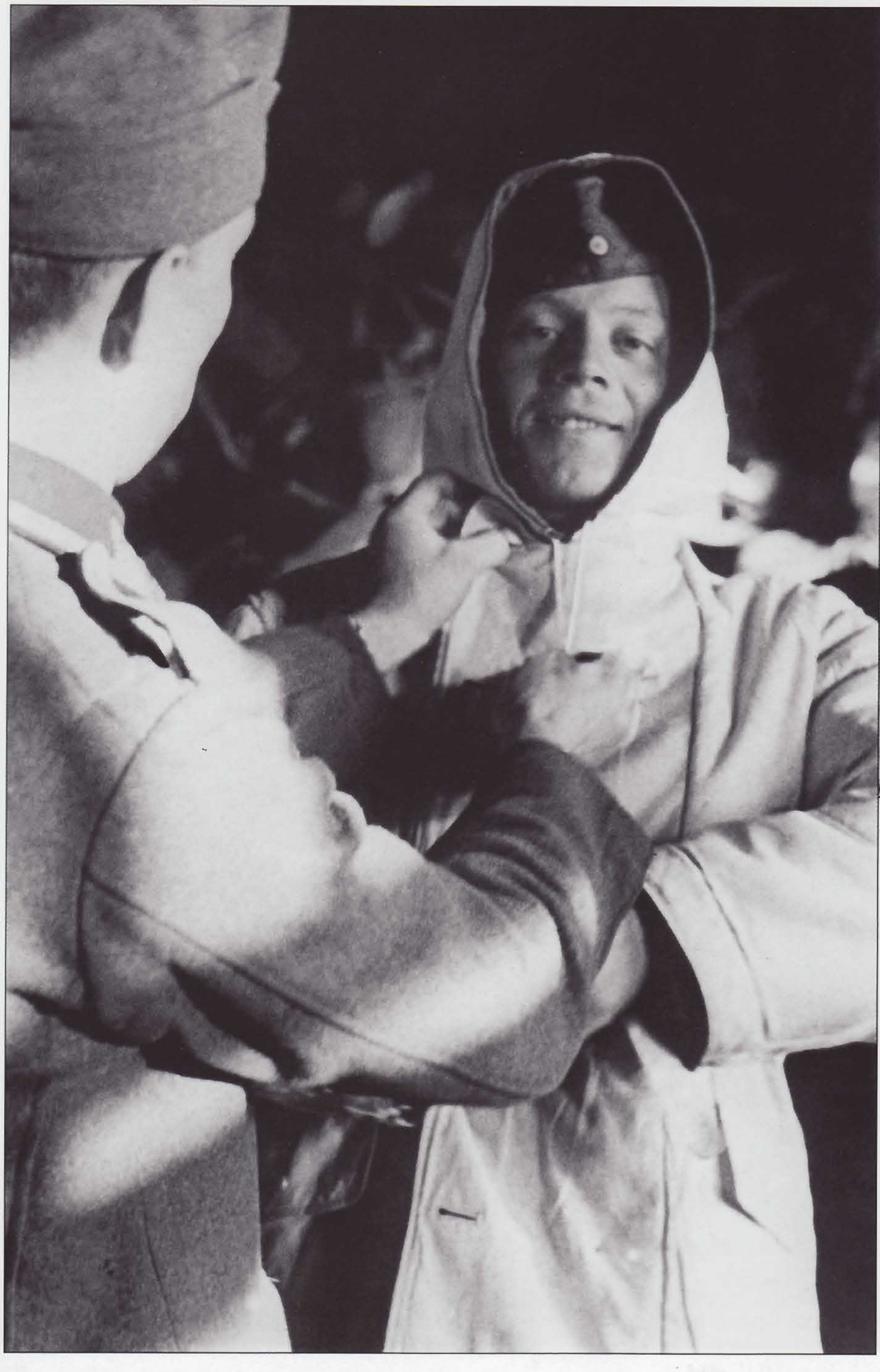


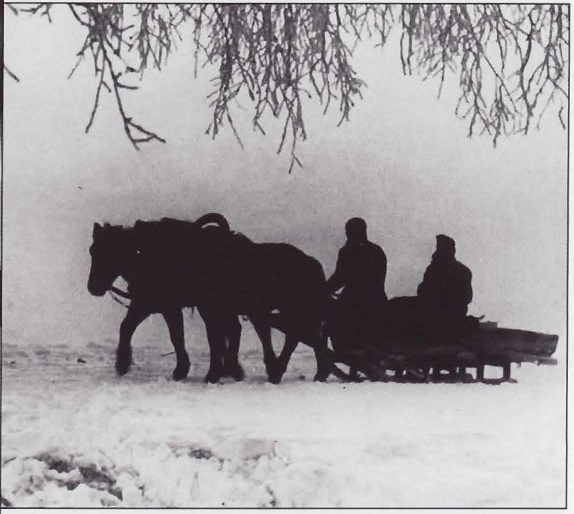
Troops check a mired and abandoned KV-1 tank. They may be considering its recovery and refurbishment. They Germans frequently made use of recovered Soviet tanks, prominently marked with a large black and white Balkenkreuz (bar cross).

A gun crewman poses beside an unidentified light artillery piece. Just about any type of artillery formerly belonging to the USSR and Eastern European countries might be found in German hands.



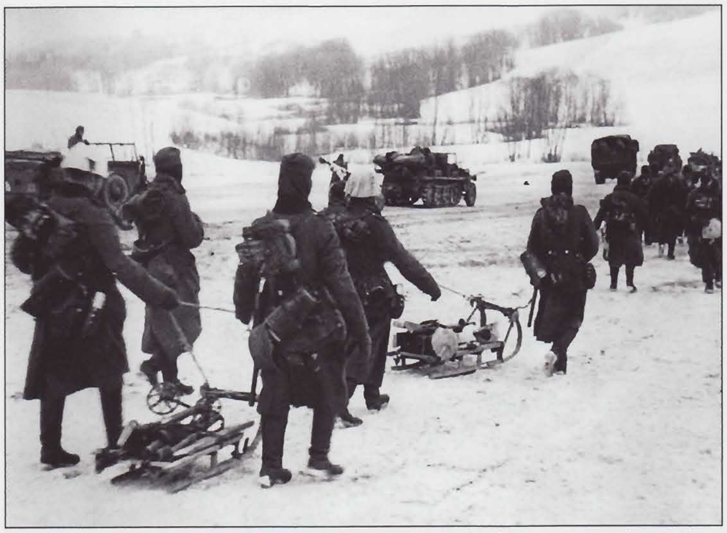
On a rare clear day Junkers Ju 52 three-engine transports wing their way to Stalingrad for a supply drop. The German soldier knew these rugged aircraft as the "Tante Ju" (Aunt Ju) or "Eiserne Anna" (Iron Annie) or simply as "Judula" (Julia). The lined-up vehicles may have been part of the failed December 1942 Wintergewitter (Winter Storm) relief effort.



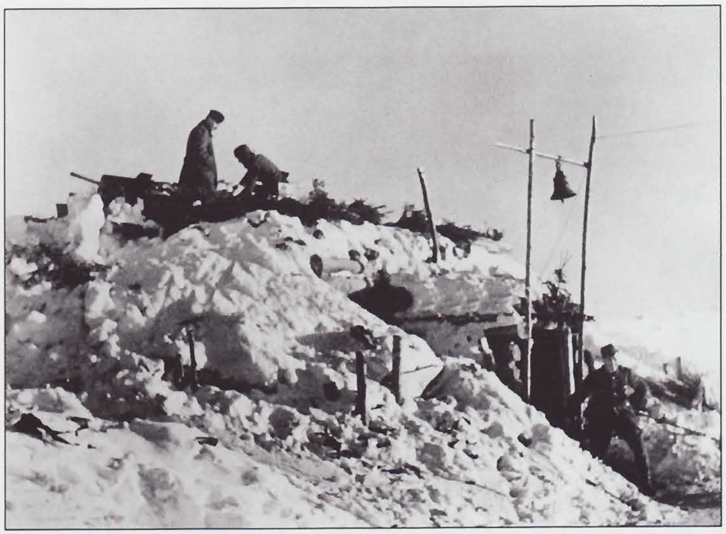


The pulk, a small Russian work sled, was used in huge numbers to replace wagons and carts during the winter snows. The Germans even set up workshops to make their own. They were drawn by one or two hardly little Bashkir ponies or any other animal that could be harnessed.

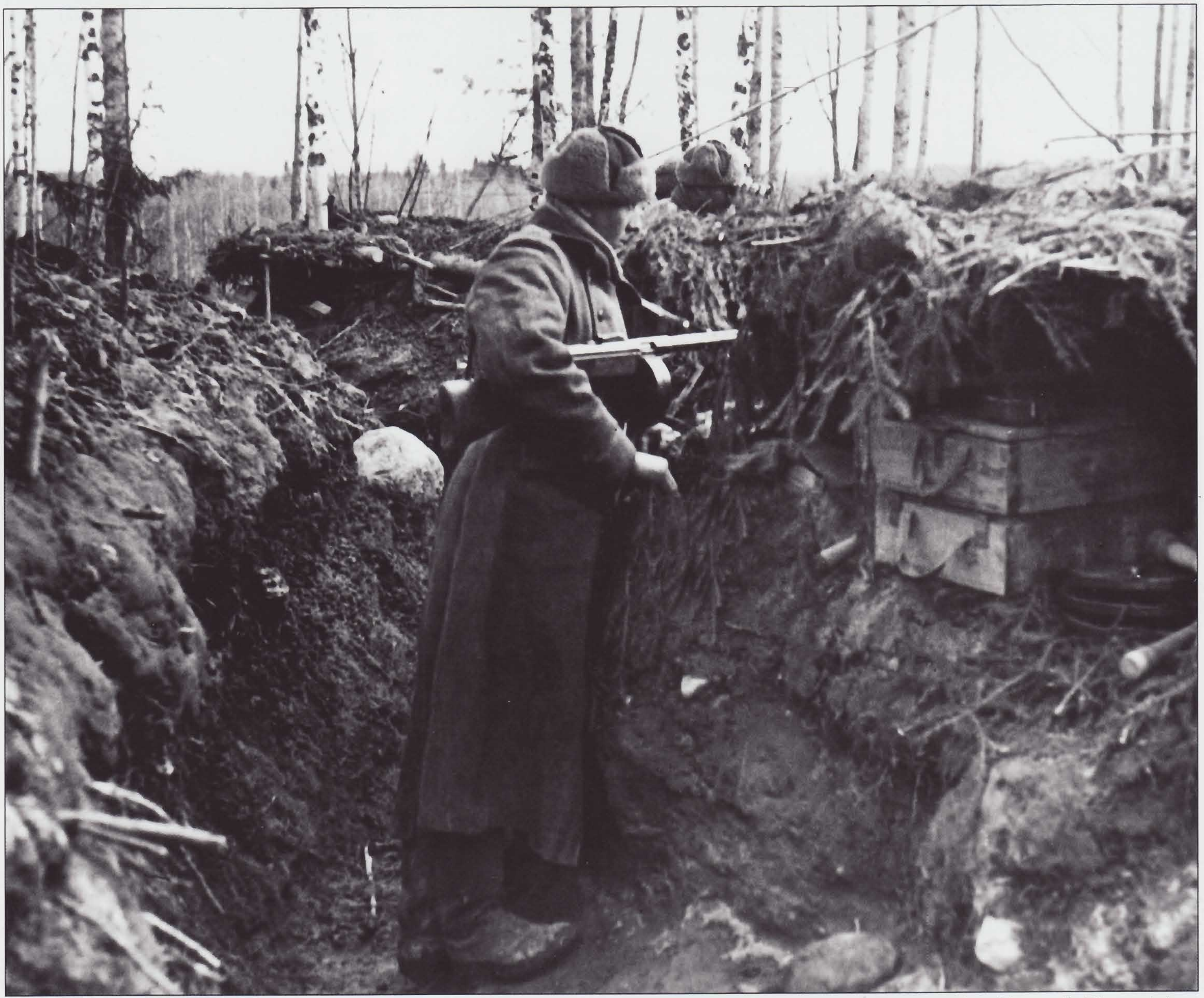
A Landser tries on the new insulated reversible winter uniform (umkehrbarer Winteranzug) first issued for the winter of 1942/43. It was white on one side and either three-color camouflage pattern or medium gray on the other.



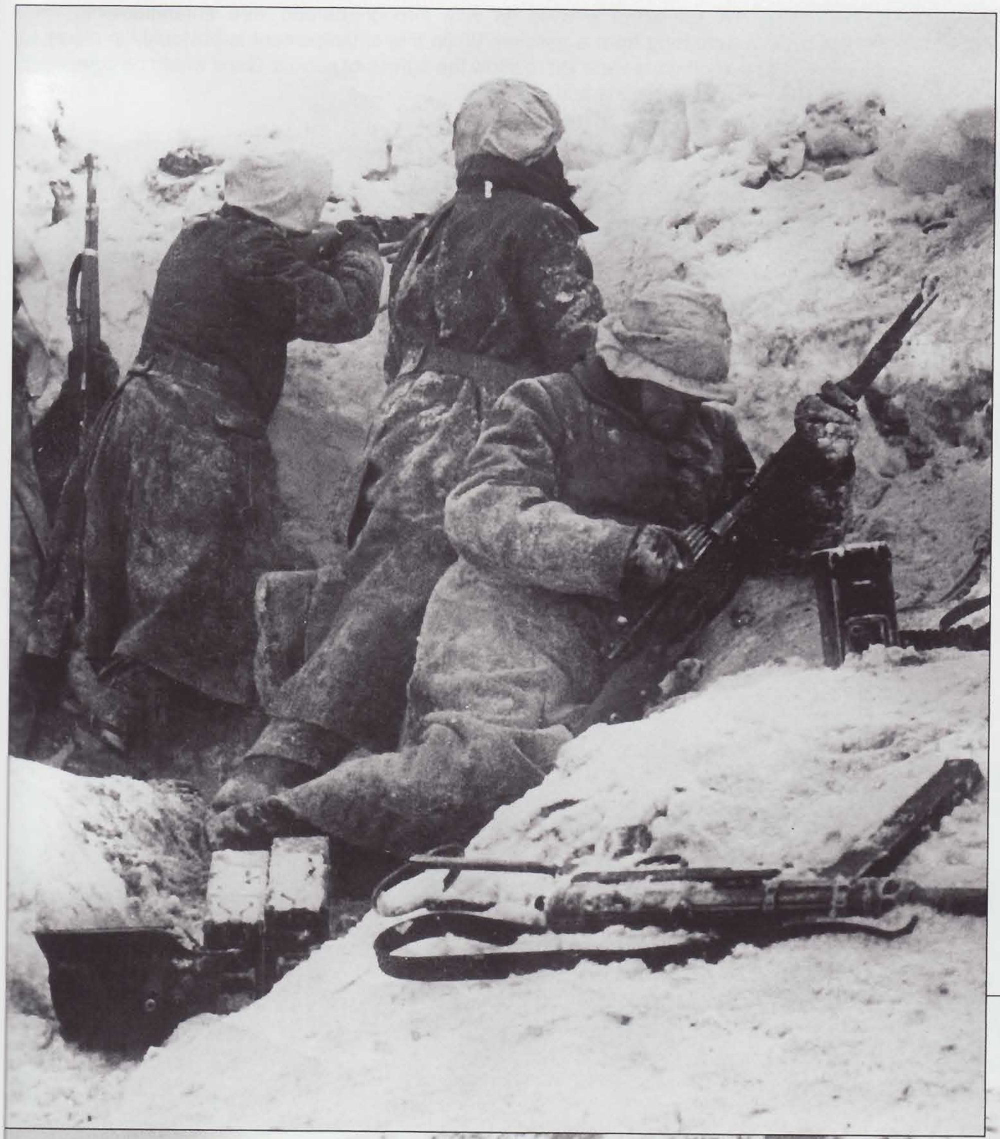
Stick grenades, ammunition cans, carbines, and other gear are hauled on children's sleds. In the center background is a 1-ton Sd.Kfz.10 light halftrack (leichter Zugkraftwagen). These halftracks were used as 2cm Flak gun and 3.7cm and 5cm antitank gun prime-movers, and as utility vehicles.



This 2cm Flak 30 position was built atop a bunker of heavy timbers and banked by snow. A bell taken from a church serves as an air raid warning bell. It would take a direct medium caliber artillery shell to knock out such a bunker. The thick covering of snow provided a great deal of protection.

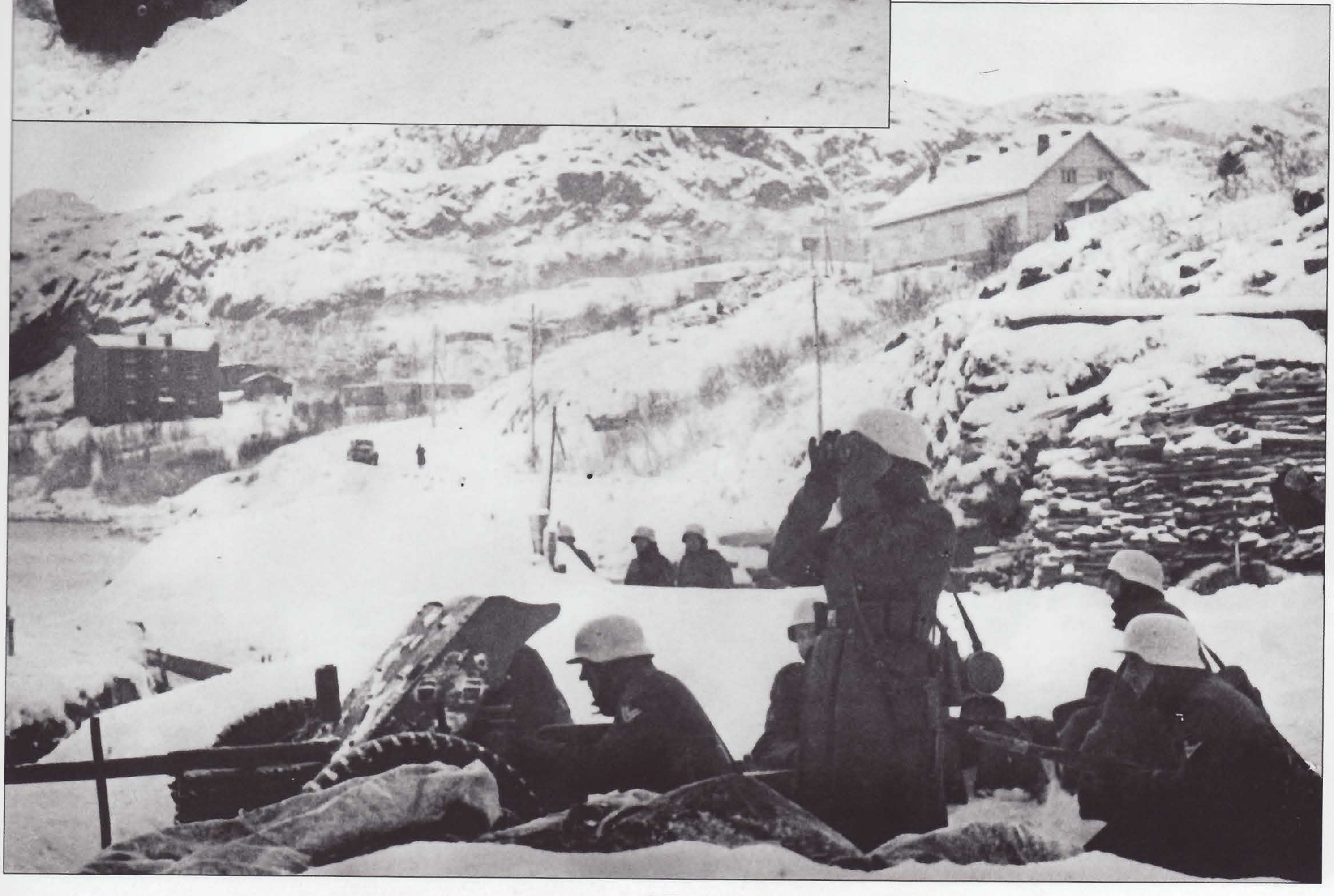


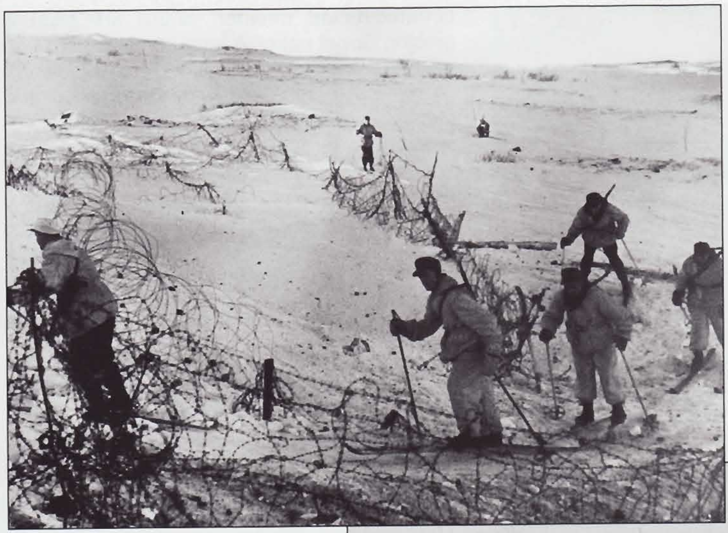
A forward trench position with a sentry armed with a Soviet 7.62mm PPSh-41 submachine gun. The latter was underpowered and heavy. Its 71-round drum magazine was slow and difficult to load, rattled, was easily damaged, and prone to jamming. The Germans used it, calling it the MP717(r), not because they preferred it over the excellent 9mm MP40, but because there were shortages of their own machine pistols and simply to field more automatic weapons suitable for close-range work in cities and forest.



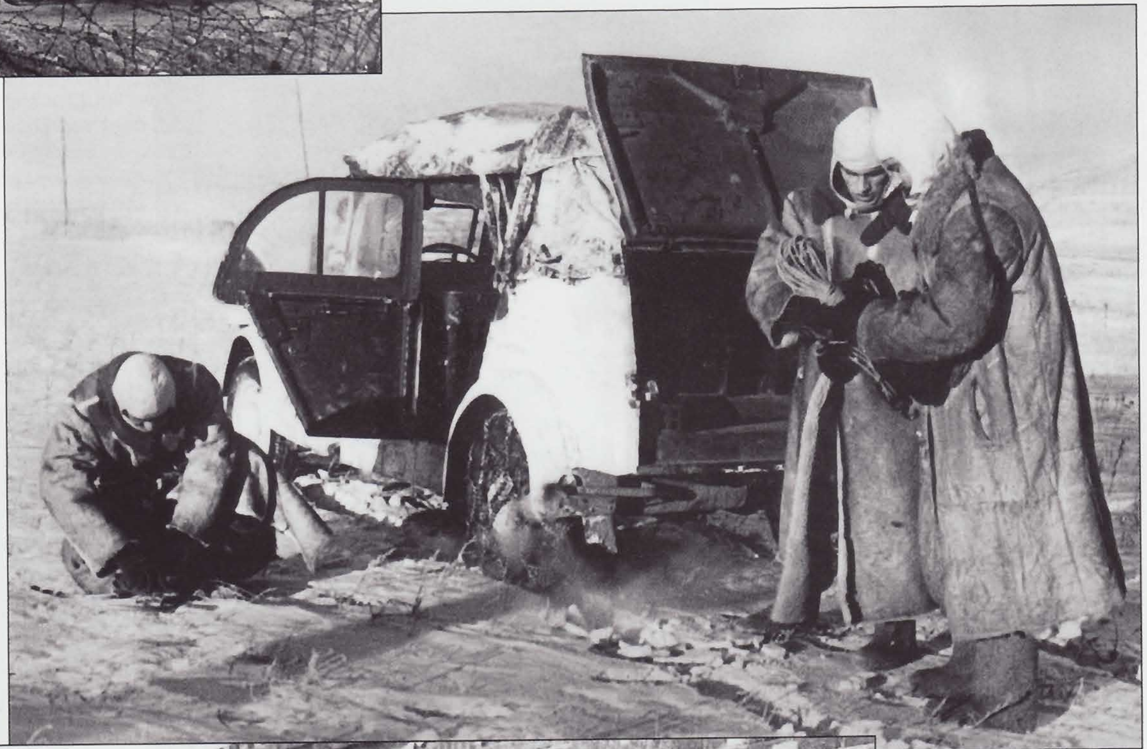
Greatcoat-clad riflemen return fire from a probing Soviet patrol. A hotly contested position might be called a Backofen (baking oven). Patrols might reconnoiter by observation and strive to remain undetected, but they would also reconnoiter by fire in an attempt to tempt the enemy to return fire and reveal themselves. Often there would be no return fire, but sometimes combat reconnaissance patrols might conduct mock attacks to draw fire. The MP40 lying in the foreground may have been discarded owing to a jam, a common occurrence in the severe cold. A functioning weapon left in the snow would soon ice up and become useless.

Wearing whitewashed helmets, the crew of a 3.7cm Pak 35/36 antitank gun is positioned outside a mountain village, perhaps in Finland. The architecture does not appear to be Russian. The Türklopfer (doorknocker) or Panzeranklopfgerät (armor doorknocker device) was ineffective against many Soviet tanks, but were useful against light AFVs and personnel; it fired a modest high-explosive round.

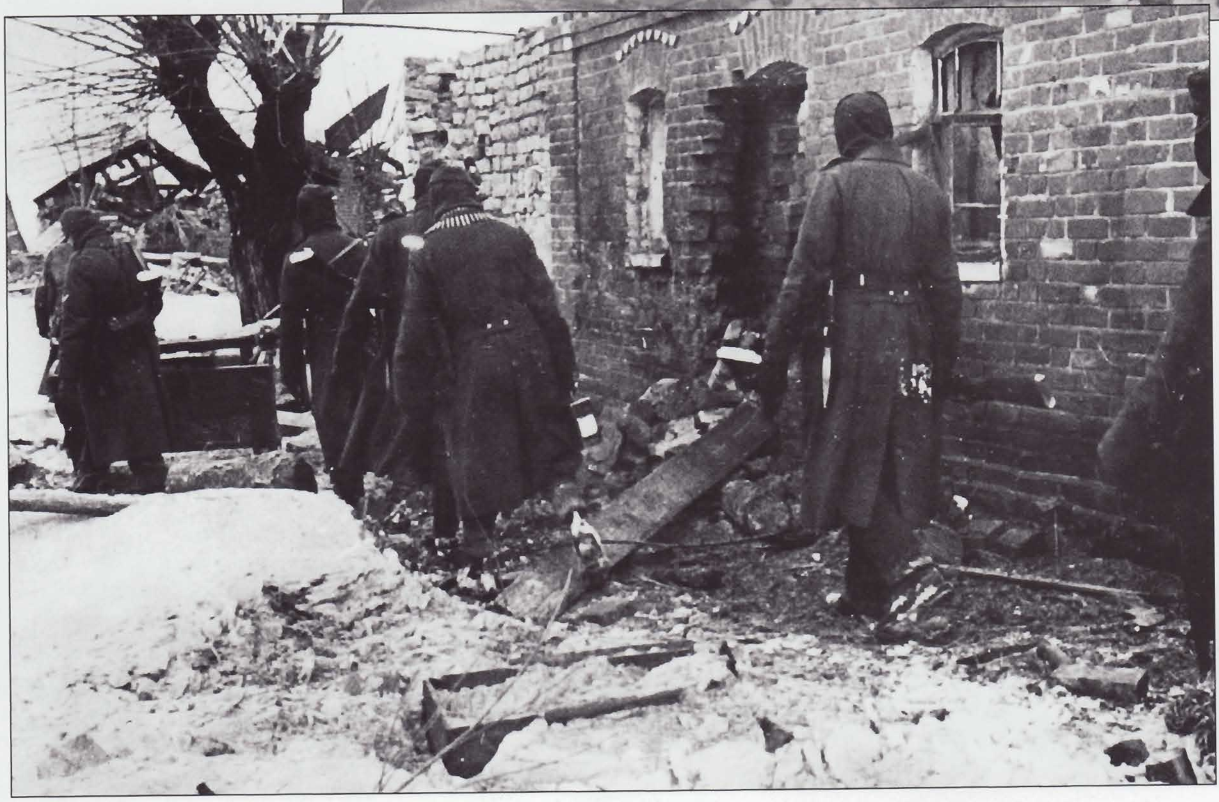




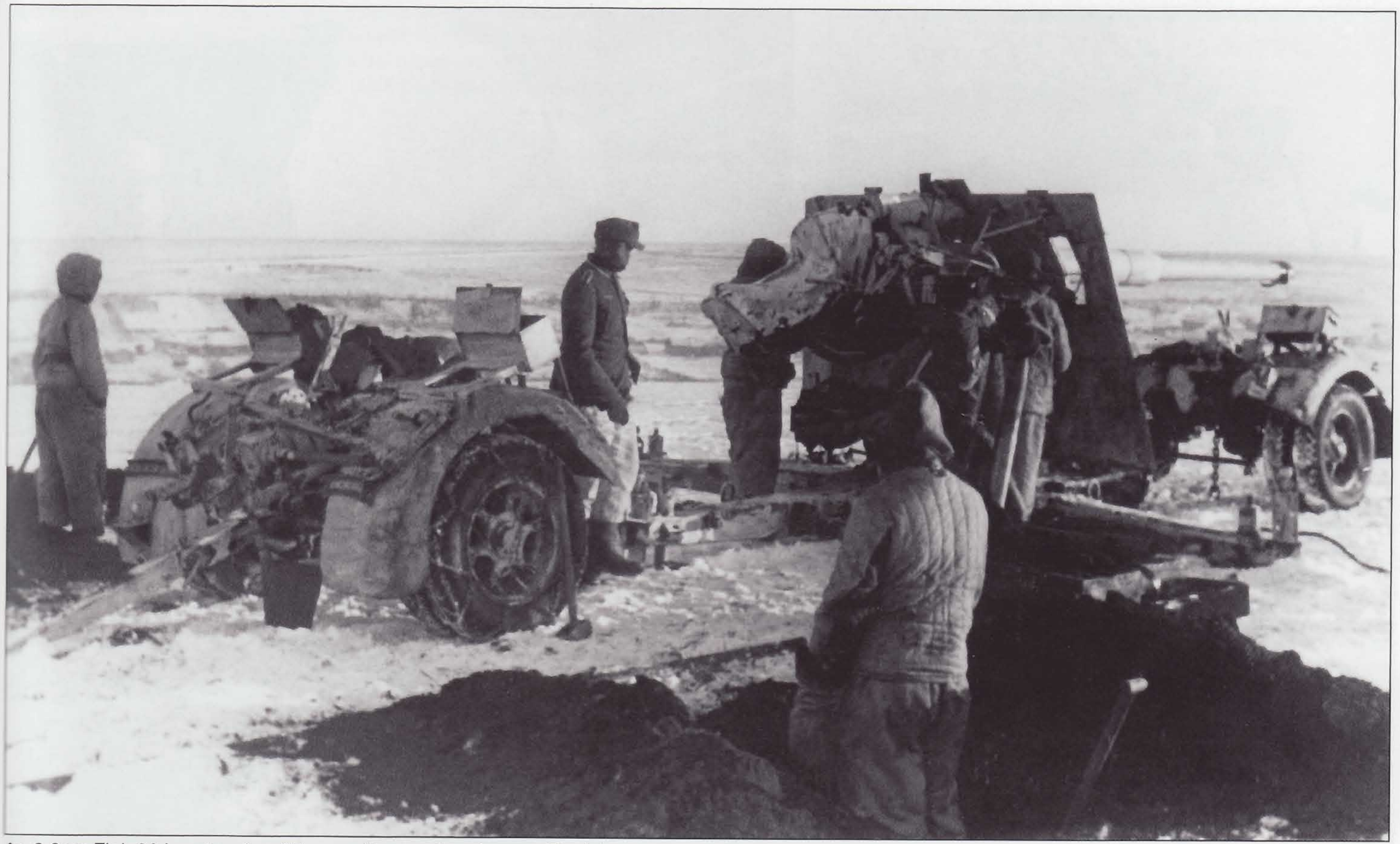
A ski patrol weaves its way through barbed wire entanglements while returning from a mission. While this entanglement is obviously in disrepair, such gaps were left to allow the egress of patrols. Gaps would be covered by machine guns and mortars.



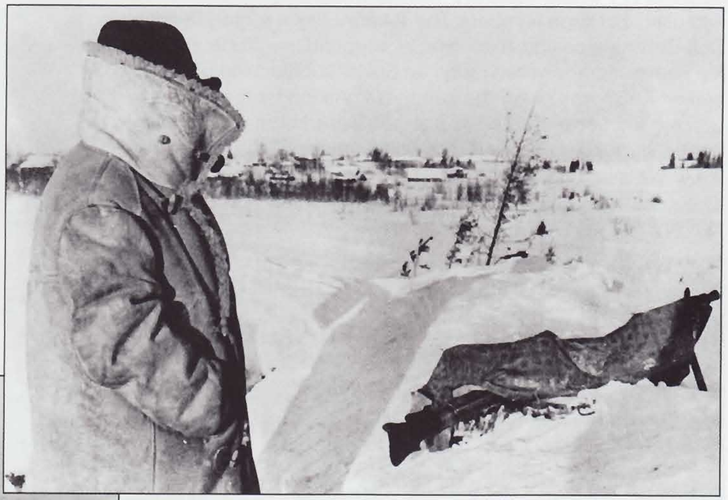
A detail of signalmen halt to repair a damaged field telephone line. Note that the rear tires of their whitewashed light field cars are fitted with chains for better traction. Rear support troops were seldom issued snow camouflage outfits.



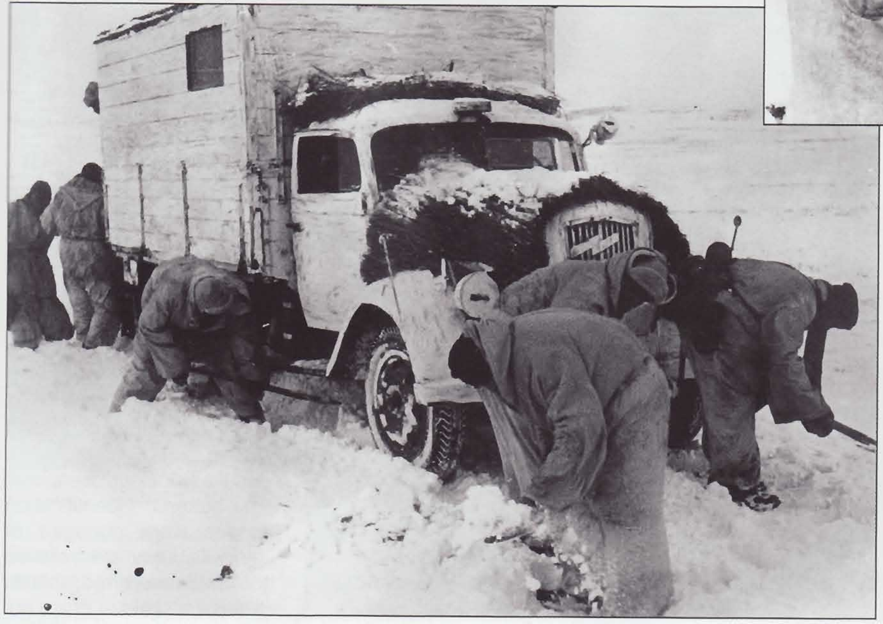
Troops make their way through a battered village. Their slung carbines indicate that the area is secure. As the winter wore on scrap lumber like they are stepping over disappeared into warming fires.



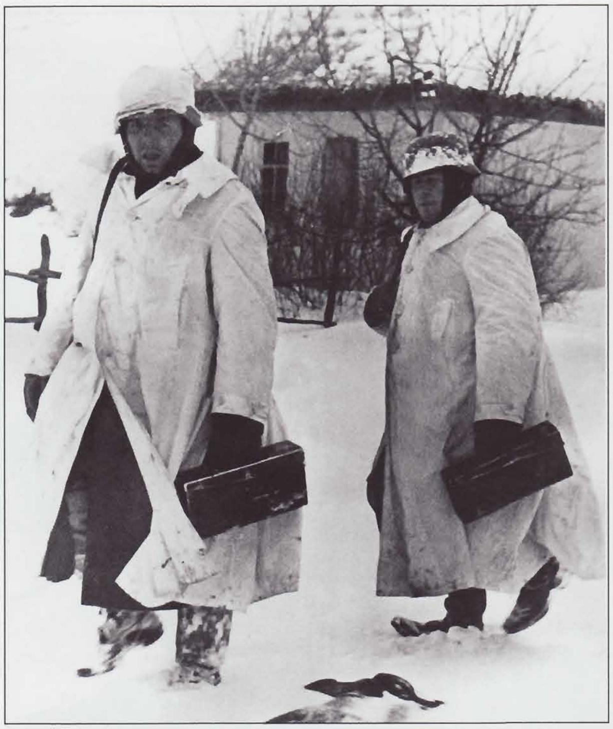
An 8.8cm Flak 36 is set up in a firing position on the steppes. The big gun was conspicuous and difficult to conceal much less dig in. The pit in the foreground is for ready ammunition. The "Acht-Acht" or "Otto-Otto", as the Germans called the "88", depended on its longer range to survive tank engagements. The ammunition handler standing in the pit wears a Soviet insulated winter jacket.



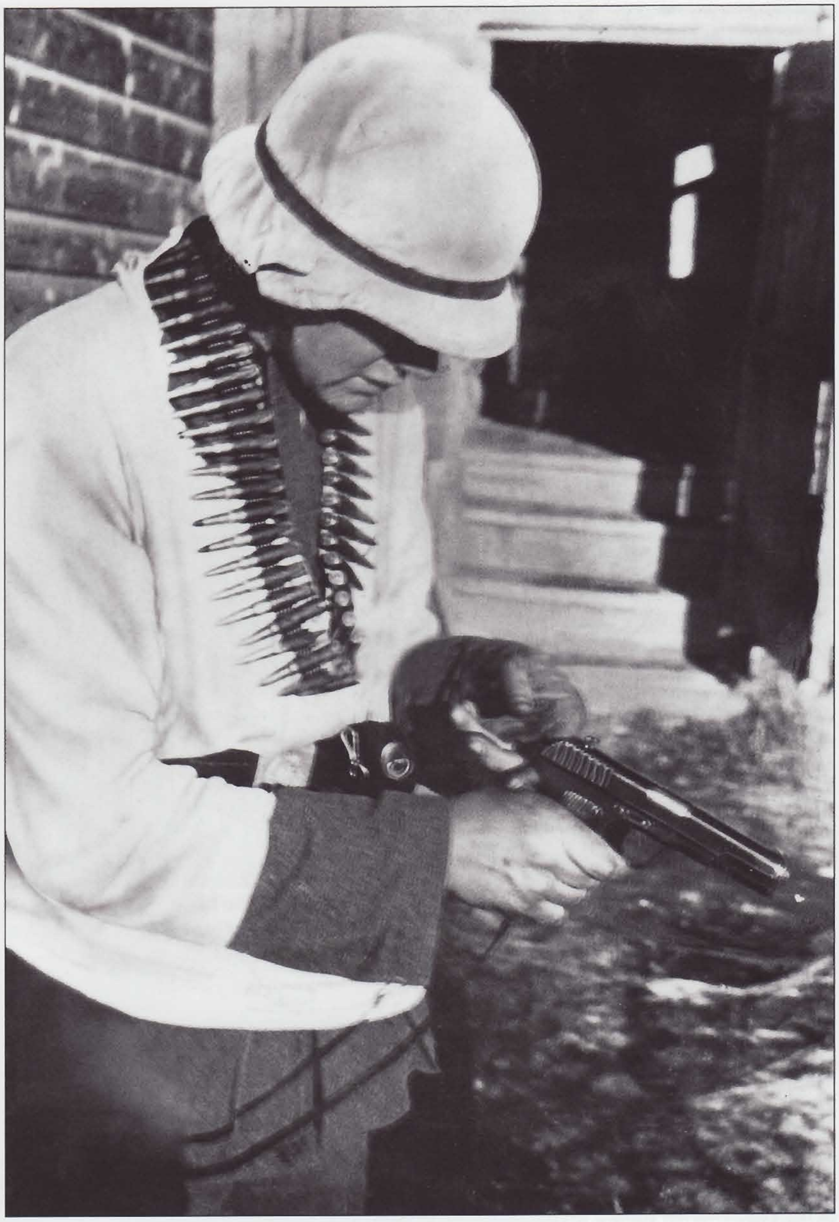
This sentry manning an MG34 machine gun has turned up the fur-lined collar of his Wachmantel (guard greatcoat). One or two of these coats were issued to each group (squad) and were passed on to the relieving sentry. They were also issued to some vehicle drivers. The machine gun is lightly protected by a bedspread. If a weapon's action was found to be frozen soldiers urinated on it to thaw it out quickly. There was no faster means in an emergency.



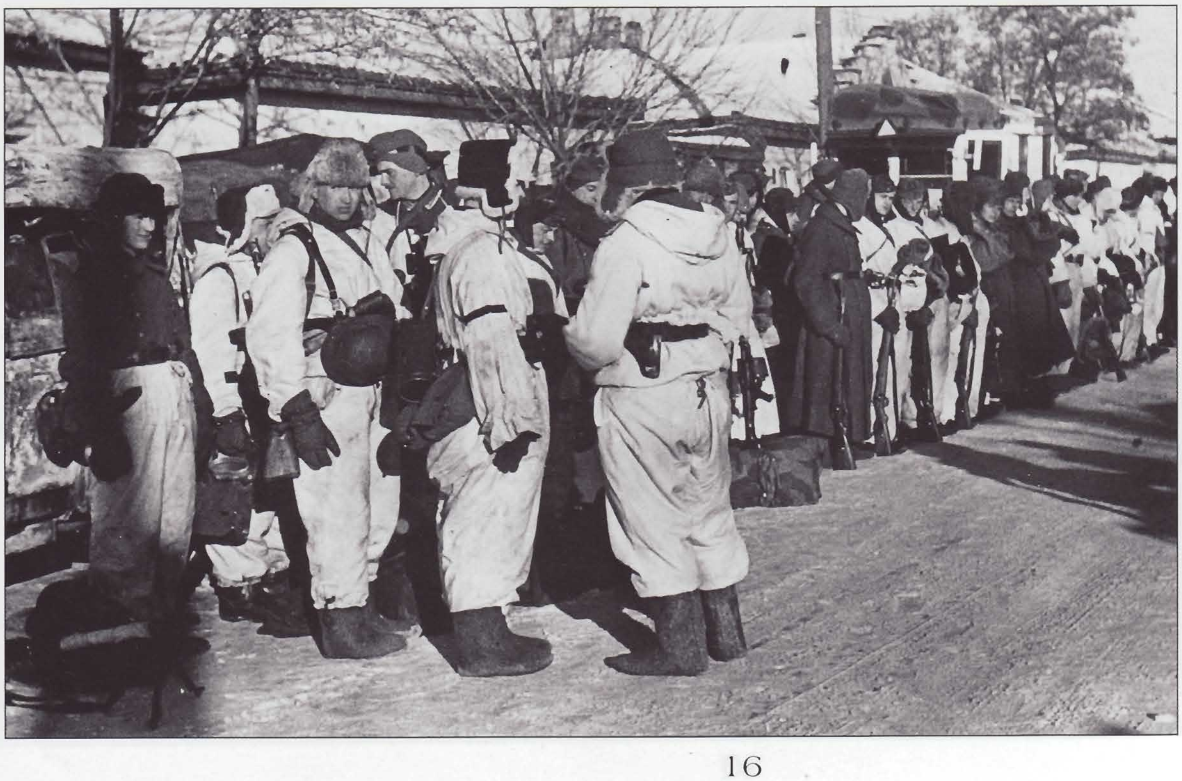
This Opel Blitz, one of the most common cargo trucks used by the Wehrmacht, was literally frozen to the ground by drifting snow blown under it. The densely packed snow has to be painstakingly dug out using pry bars, picks, and shovels. Care had to be taken not to damage the oil pan, exhaust system, tires, and other parts on the underside. Note the thick reed matting used to insulate the hood.



Two Landser pass a Russian corpse. They are wearing snow camouflage coveralls (Schneetarnanzüge) and carrying machine gun ammunition boxes, the Patronenkasten 34 (Pat.34). Each metal can held six 50-round belts or one 300-round belt of 7.92mm ammunition. The cans were usually painted dark "field gray", a dark olive green.

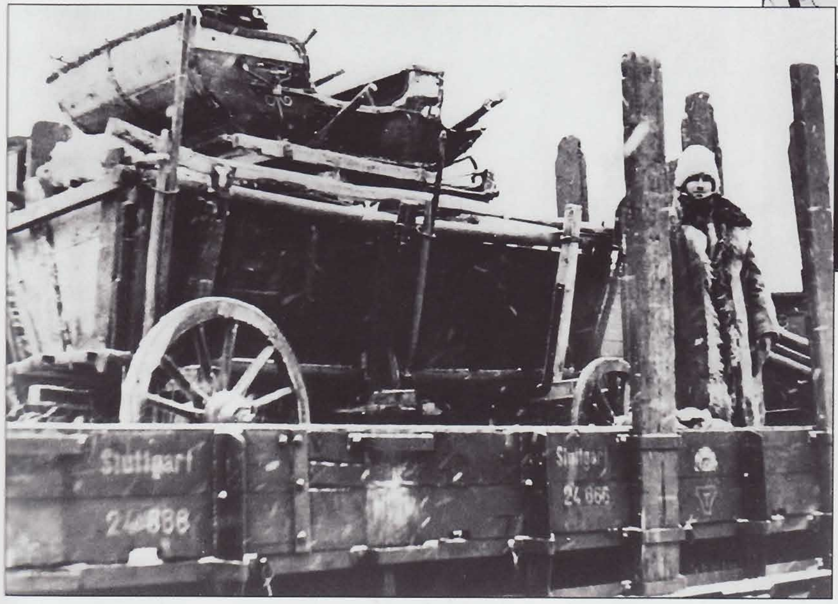


This Landser chambers a 7.62mm round in a Soviet Torkarev TT-33 pistol (TT = Tula-Tokarev). The Germans called it the P.615(r) and used it in large numbers. The Tokarev was a slightly modified Colt-Browning design. It used an eight-round magazine and fired the same underpowered round as Soviet submachine guns. The earlier TT-30 was given the same designation by the Germans. Differences between the two models were internal. Around his neck this soldier carries a 50-round machine gun belt, which could be linked together endlessly. The black tipped bullets are armor-piercing. His helmet cover is secured by a rubber inner tube band.

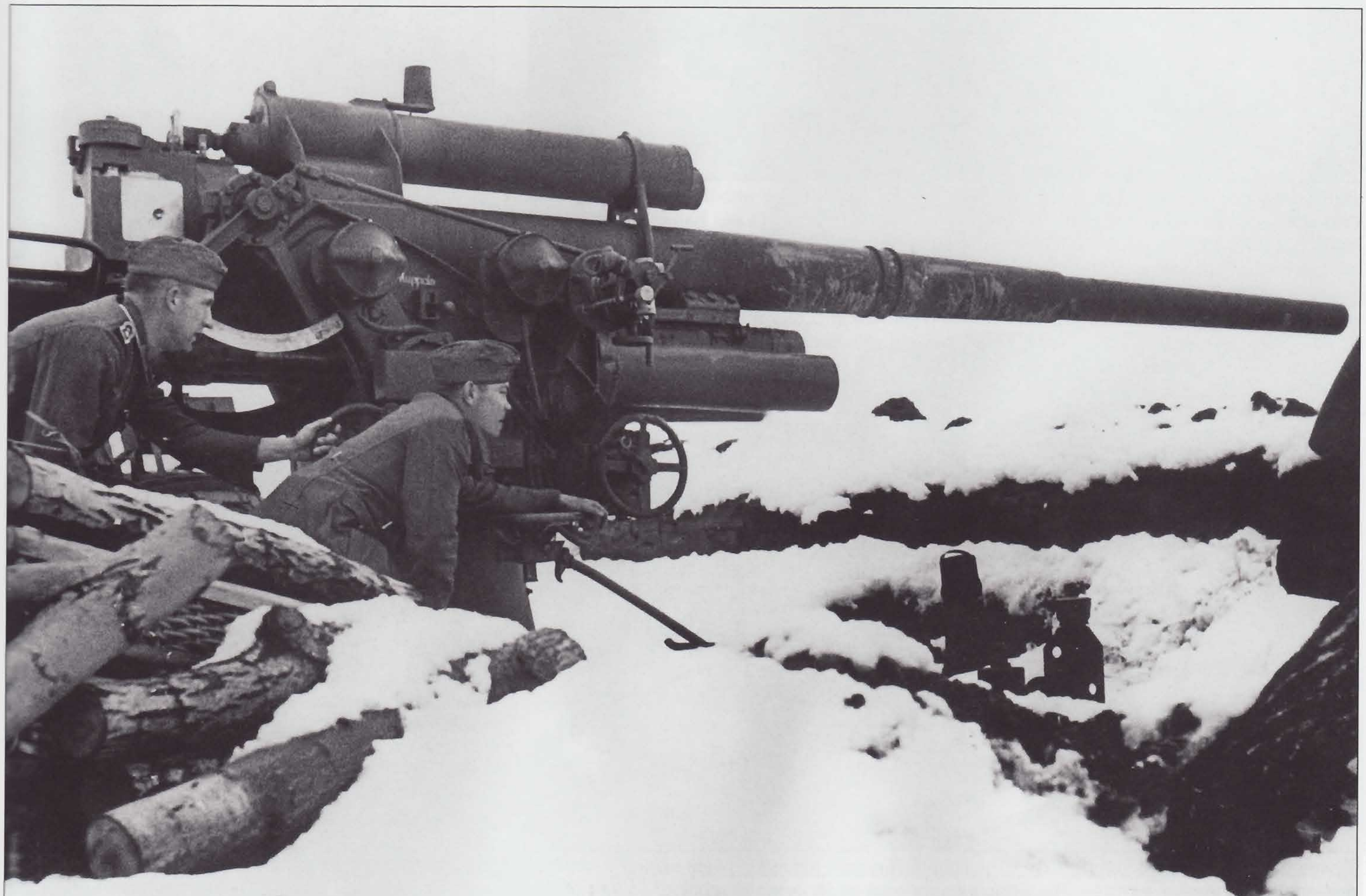


A rifle company lines up to await transport. The lack of uniformity apparent here was very common on the Eastern Front. The men in the foreground wear Russian felt boots made of 1/4-inch (6 to 7mm) gray felt. These were worn over regular boots and proved quite warm. They had to be removed when the snow melted as they would fall apart when wet. Note the officer to the right foreground carries a small holster on his hip for one of many makes and models of 7.65mm (.32-caliber) or 9mm kurz (.380 short, but actually .35-caliber) pistols used as back-up weapons. The button-on identification stripes were changed at intervals. They are believed to have been red, black, green, and blue.

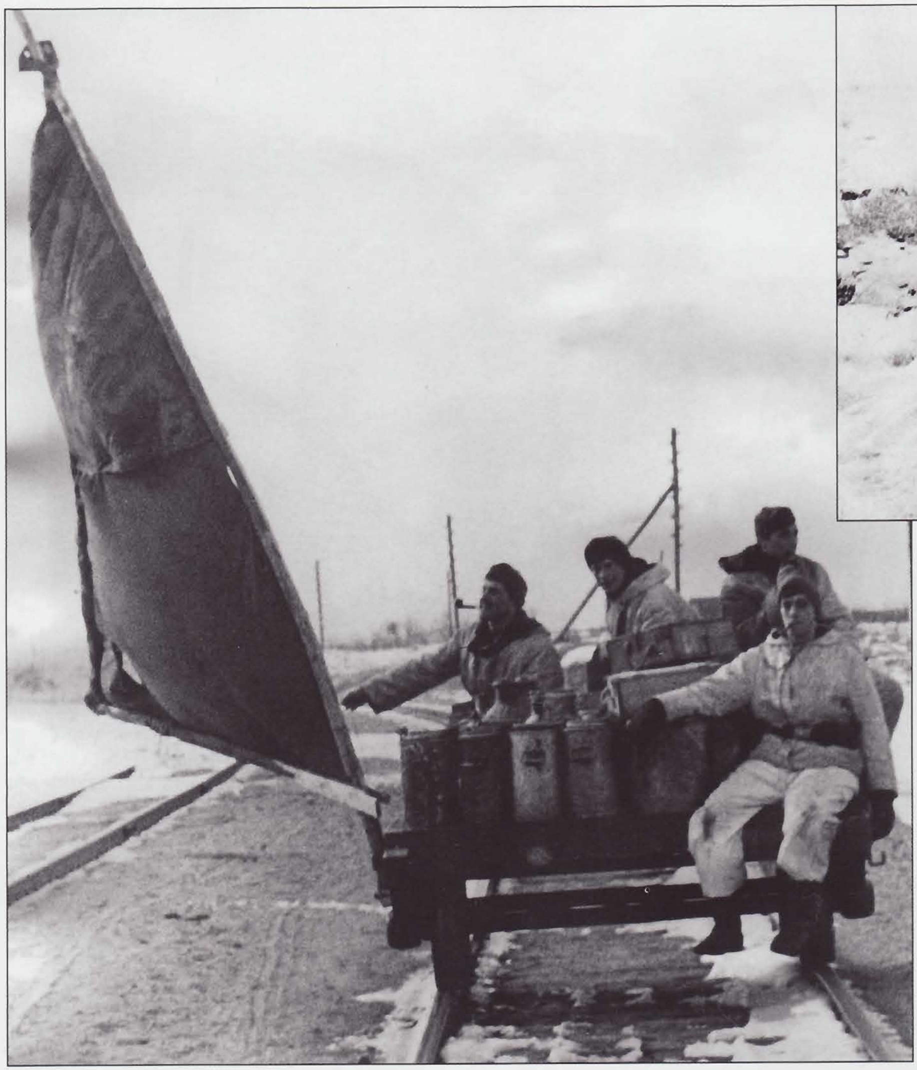
A convoy to the front winds past an "Unterstand" (underground shelter), also known as a "Wohnbunker" (living bunker) with its stovepipe bellowing smoke. Such bunkers housing a half-group or full group (squad) were comfortably warm, excepting the smells of burnt food, body odor, stale urine and wet wool, and the ever present lice.



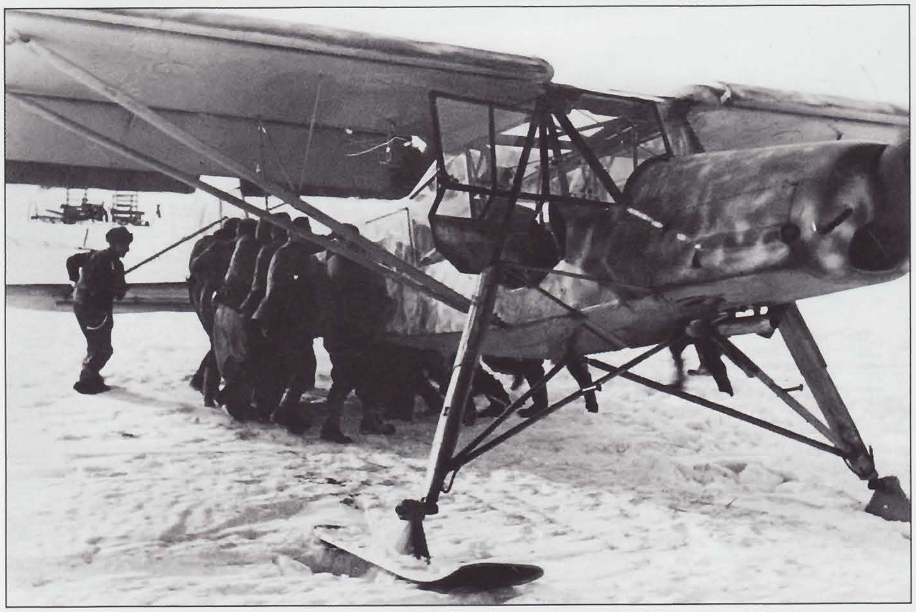
War booty. A Russian farm wagon with a small sled lashed on top, both valuable means of transport. Wagons of the era commonly had larger rear wheels, but the small wheels all around were common in rural Russia. Although they reduced the wagon load capacity somewhat, they cost less and used fewer materials. Moreover, Russian peasants did not have much to carry.



Even when the 8.8cm Flak 18 was dug into a pit, its size and mass made it difficult to conceal and protect. The high mounting was necessary to achieve near vertical firing elevations and allow for the gun's considerable recoil. This feature gave it a high profile, a liability for an antitank gun. The crewmen appear to be trying to identify what they see through the mist.



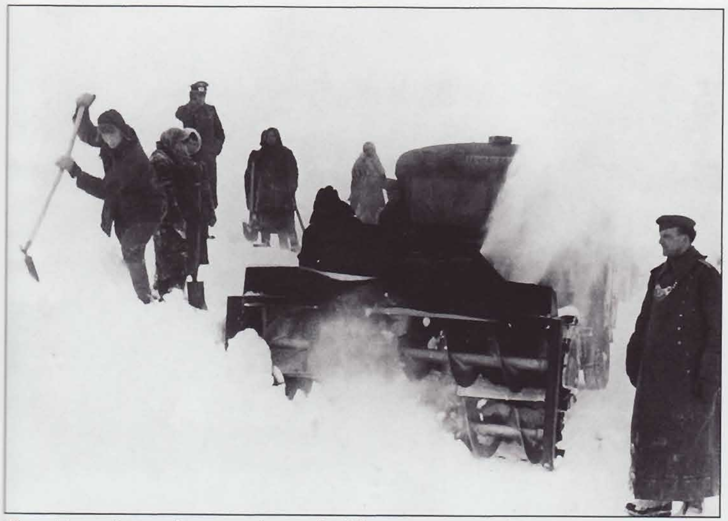
Transport came in many forms. Here a truck (set of railroad car wheels), probably from a destroyed boxcar, has had a platform built on it and is propelled by a sail harnessing the wind blowing across the steppes. The inventive Landser railroaders are delivering soup and other rations in milk cans and insulated containers as well as ammunition to frontline positions.



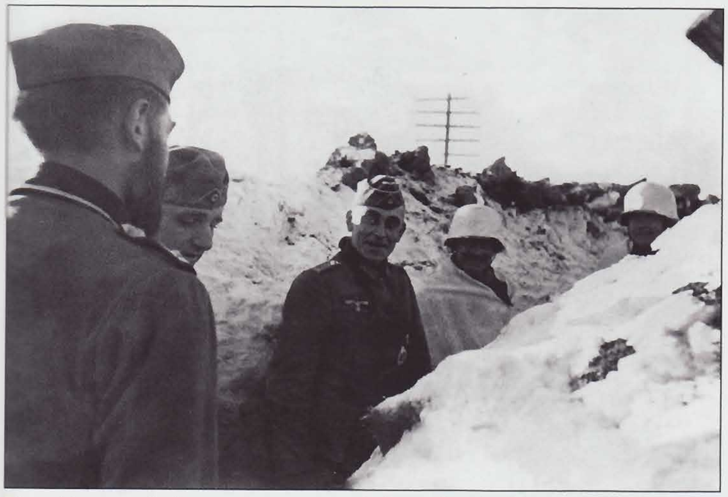
Troops hold a Fieseler Storch (Stork) Fi 156 light observation aircraft in place in high winds as it delivers much needed supplies. The Storch was employed for artillery spotting, courier duties, and transporting senior officers. When units were cut off these aircraft were often the only means of evacuating wounded and delivering small amounts of ammunition and medical supplies. The little plane carried a pilot and two passengers. It could land within just 20 meters (66 feet) and take off in 60 meters (200 feet). It required a bit more landing space with skis as pictured here, for there were no wheel brakes.

Russian horses, smaller, but hardier than German and Western European breeds, were used extensively as pack horses. Each rifle platoon was authorized a horse and small cart, but in many units they were concentrated in the company train for supplies, ammunition, and baggage transport.

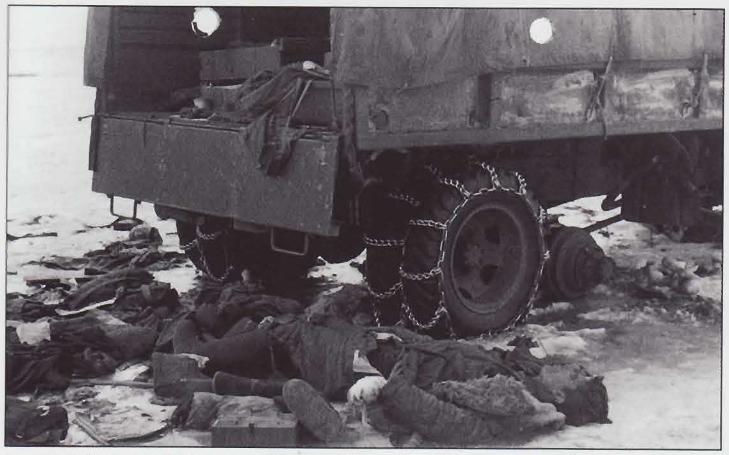
Obviously pleased with the expectation of a feast these troops carry sausages and a steer's hind-quarter back to their unit kitchen. Sausages were one of the most common forms of preserved meat issued to the troops as they kept for a long time and had high calorie and fat content. Both were essential in cold weather. In Stalingrad the food airlifted to the beleaguered garrison was concentrated rations, which maximized the amount that could be transported. Yet these rations promoted weight loss. When this was realized fatty foods and spreads were flown in. The sudden consumption of fats and rich foods caused many stomach problems and even death.



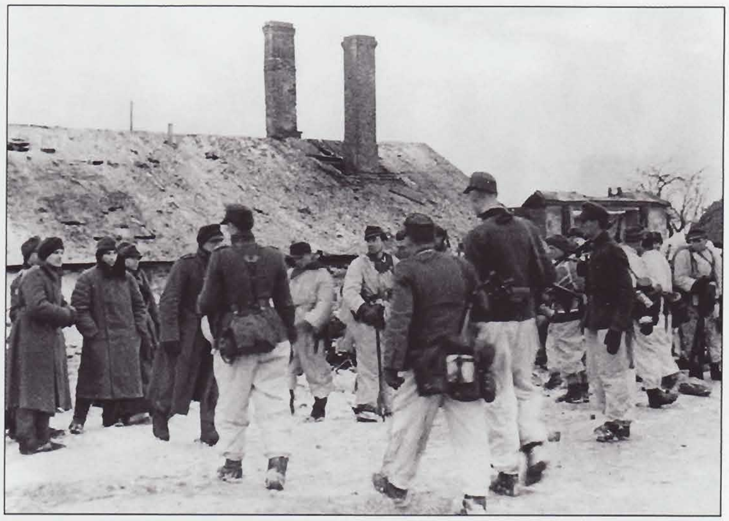
The Heer formed a number of different types of snow removal units (Schneeräumeinheiten) to operate snowplows and snow-blowers. It was critical that lines-of-communication be kept open for truck, wagon, and foot traffic. These units, under the pioneers (Pioniere), also kept airfield runways open. Here a snow-blower half-platoon (Schneefräsen-Halbzug) clears a road. These units were often augmented by Russian prisoners of war or local civilians, which explains the presence of a field military policeman (Feldgendarm) to the right.



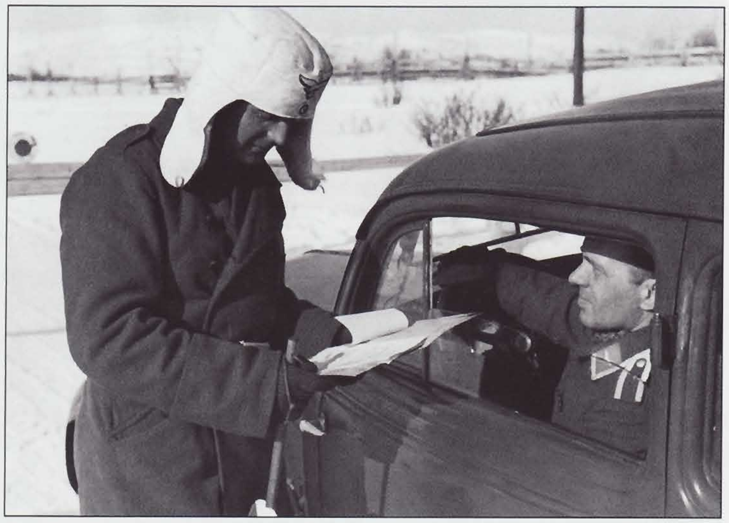
The older man in the center appears to be a Sonderführer (special leader). These were usually recalled reservists too old for combat service, but employed as interpreters, doctors, and other specialists. Beards were uncommon in the Heer. To the left is a Feldwebel. Often individuals sporting beards suffered a skin condition aggravated by the cold.



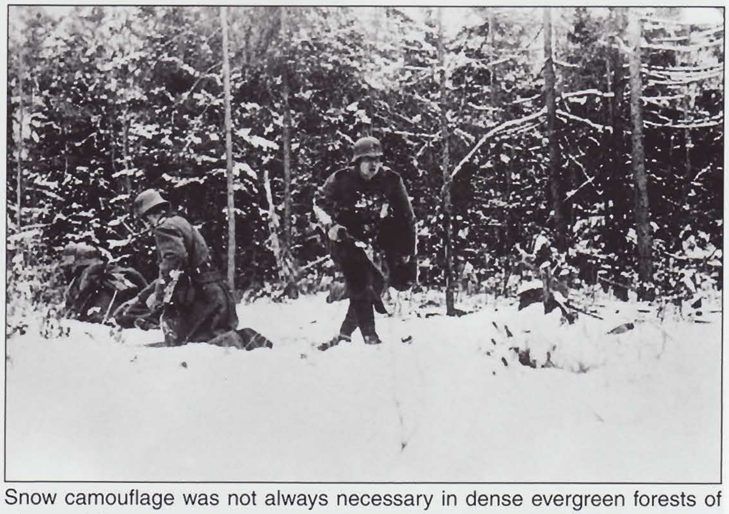
A troop transport damaged by artillery fire. The scattered felt boots and rucksack contents make it appear that there were additional casualties. On the rear tires are ice chains, which were scarce items.



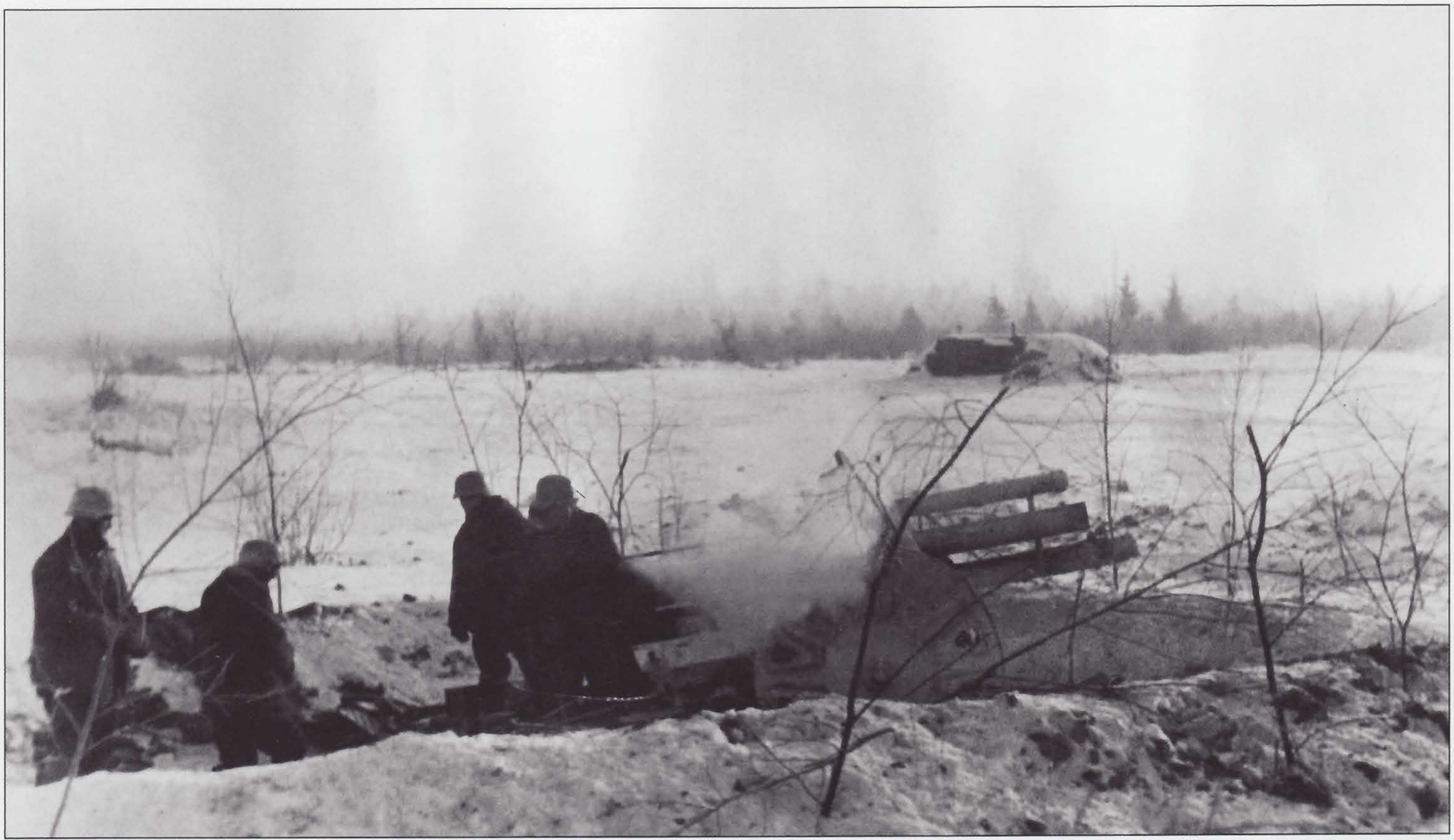
A company forms up in a rear area, probably to be assigned daily work and guard details. Note the complete lack of helmets. Troops were generally allowed to wear what they pleased and what was appropriate for their duties. There were also such shortages of uniform component that standardization was impossible.



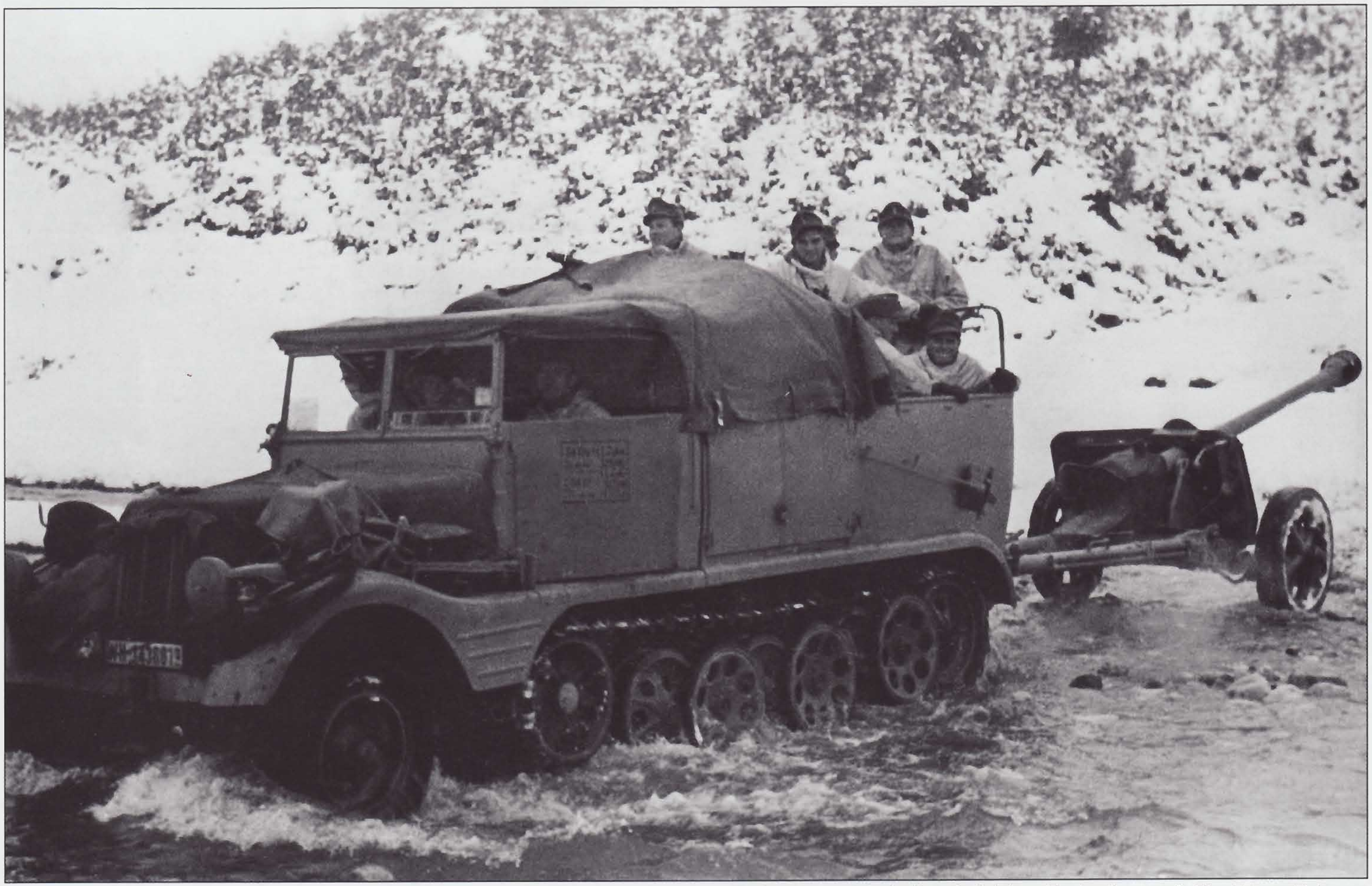
A Luftwaffe Unteroffizier presents his travel papers to a sentry. The sentry wears a high-quality white, fur-lined winter cap adorned with the Luftwaffe eagle. The collar tab of the driver appears to be red, the Waffenfarbe of the Flak troops. Their uniforms are blue-gray.



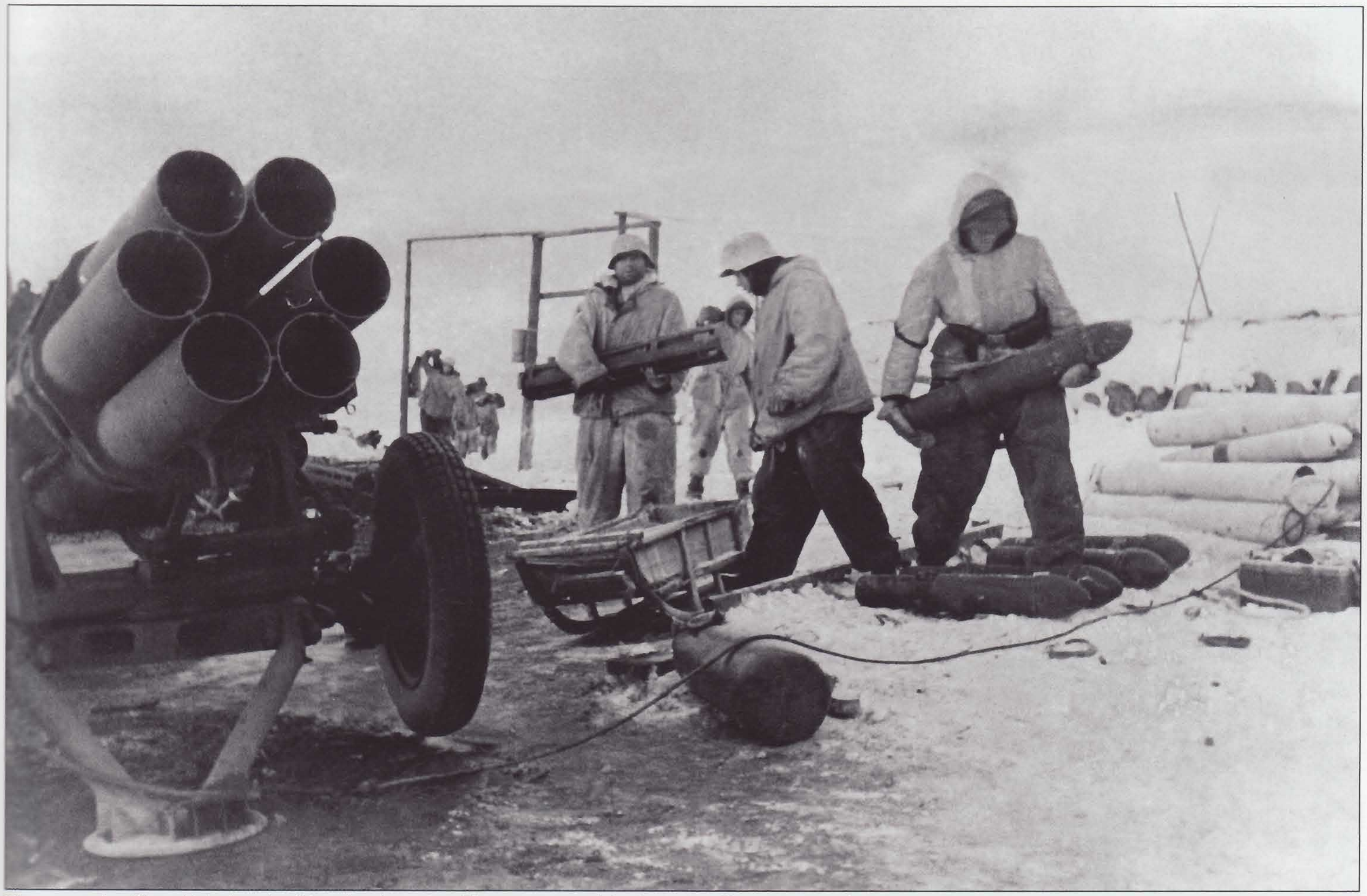
Snow camouflage was not always necessary in dense evergreen forests of pine and fir. A soldier clothed in a white snow suit moving upright or at a crouch would be conspicuous against the green background. It was not uncommon for the Landser to shed white outfits in such conditions and rely on his green-predominating field gray. Note that snow naturally sticking in small patches helps soldiers blend into the background.



A 10.5cm l.FH18 light field howitzer (introduced in 1933) was the standard German divisional field artillery piece. While a few cut saplings have been stuck in this position's parapet, it was extremely difficult to conceal the large weapons in the winter. Besides muzzle flash and smoke, the muzzle blast kicked up snow. Moreover, white snow forward of the muzzle was scorched black or blown clear to reveal bare ground.

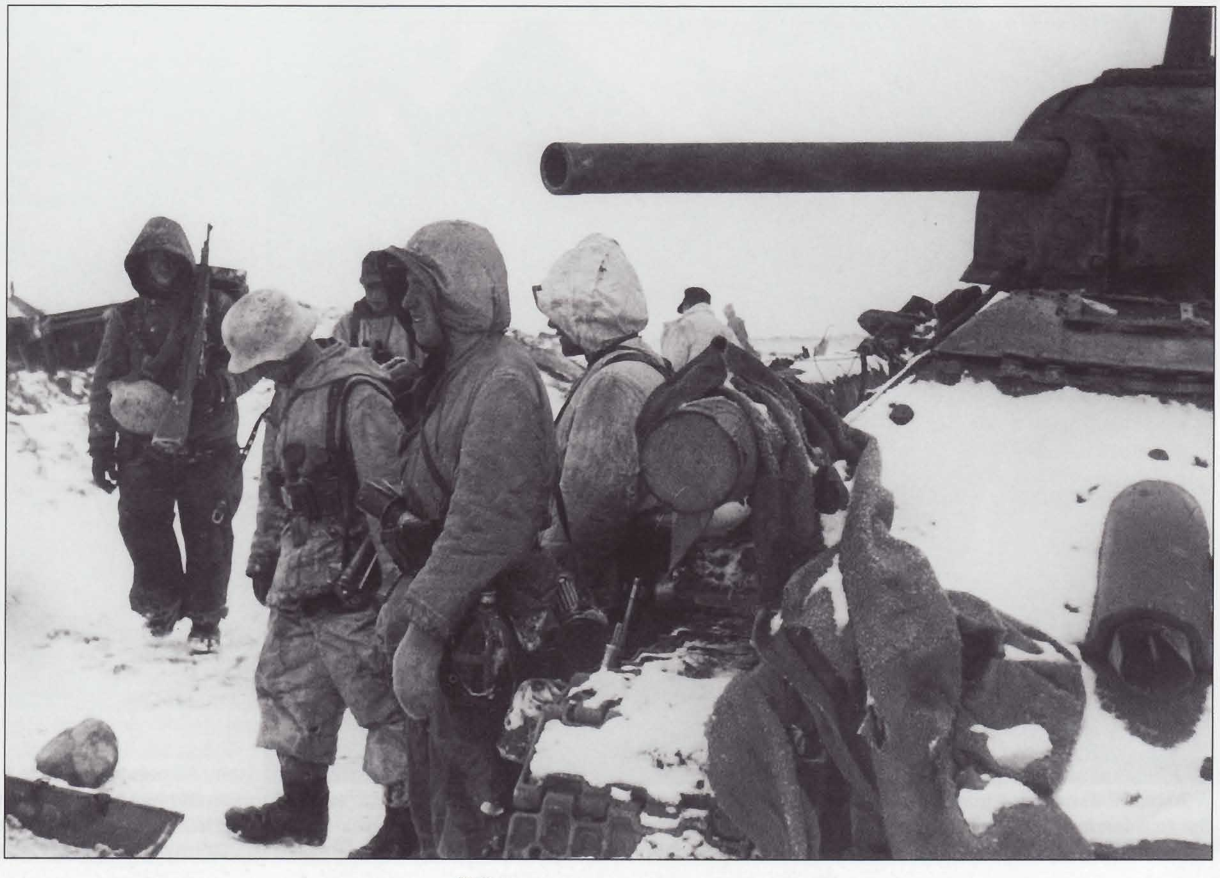


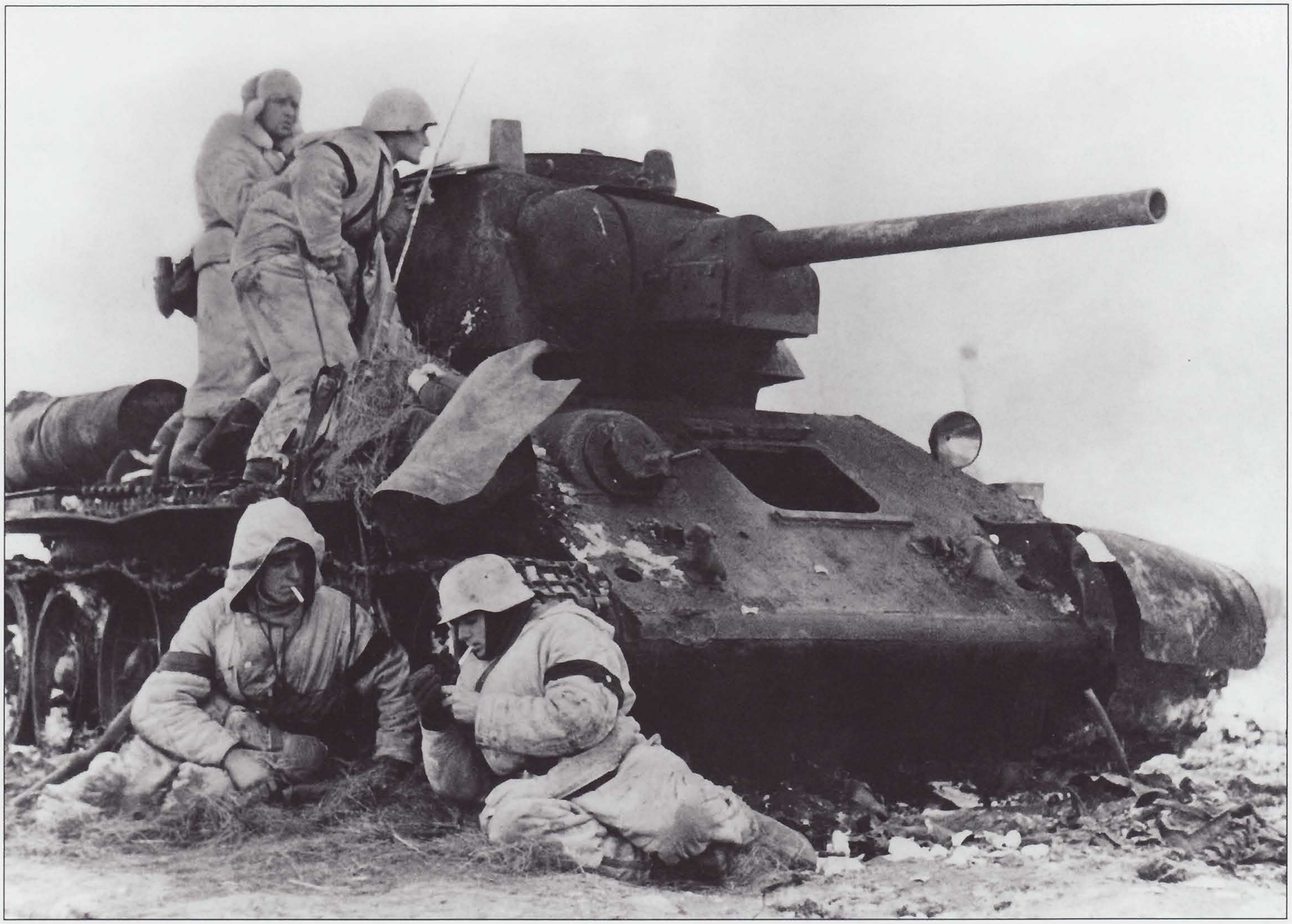
The crew of a 7.5cm Pak 40 antitank gun crosses a mountain stream aboard a 3-ton Sd.Kfz.11 light halftrack (leichter Zugkraftwagen). The 7.5cm Pak was mainly a divisional antitank gun, but some were assigned to regimental antitank companies. The canvas troop compartment cover provided some comfort, but like any unheated vehicle this one offered a cold ride.



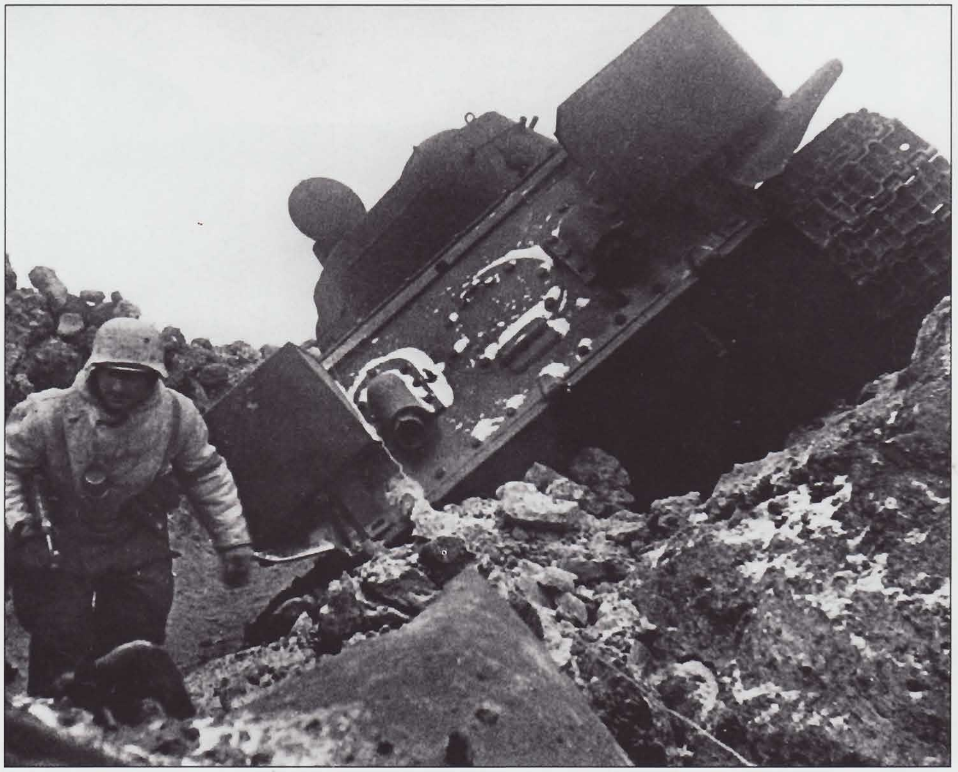
The crew of a 15cm Nebelwerfer 41 rocket launcher. The extreme cold adversely affected the performance of the high-explosive rockets, which were painted black. They had to be protected from the cold and were brought out into the open just before firing. The frozen solid propellant might fail to ignite or caused erratic flight path and widely varied range. The inaccuracy this caused was compounded by the fact that snow somewhat muffled the otherwise substantial blast effect. There was not a great deal of fragmentation caused by these rockets as the bodies broke up in large pieces, but snow and frozen ground reduced secondary fragmentation from gravel and rocks.

A patrol pauses beside a knocked out T-34/76 tank. The insulated winter suit was designed to allow individual equipment to be worn beneath it to protect ammunition, grenades, and the water bottle from freezing. However, the necessity for immediate access in the frontline made it essential for this item to be worn on the outside. To unfreeze a water bottle cap it had to be held in bare hands and breath blown on it.

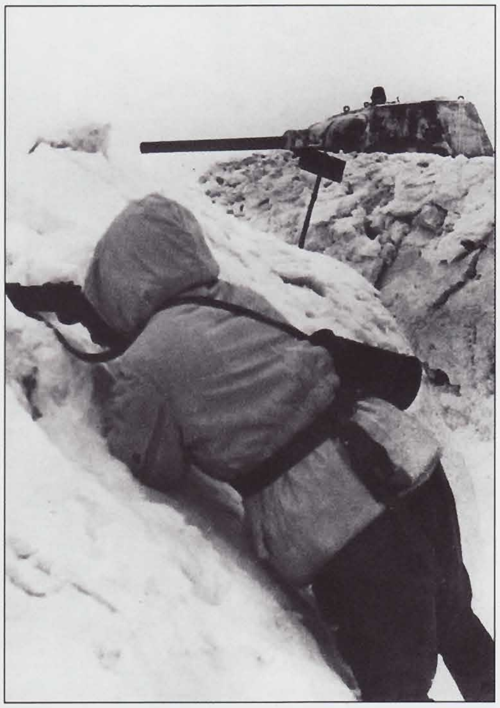




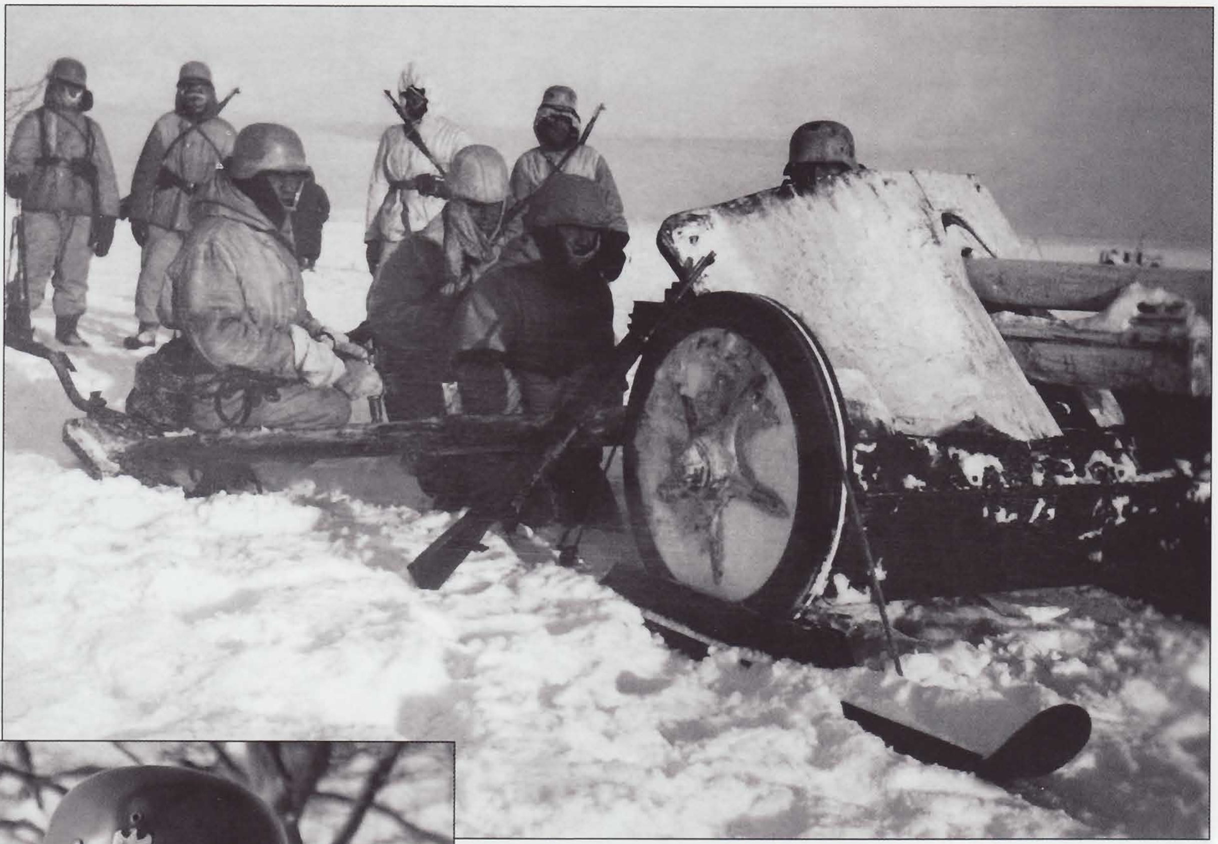
A burned out T-34/76 is used as an observation post by a patrol forward of the lines. Cremated remains of the crew and sensitized ammunition surviving the fire scattered about inside prevented tank hulks from being entered for protection.



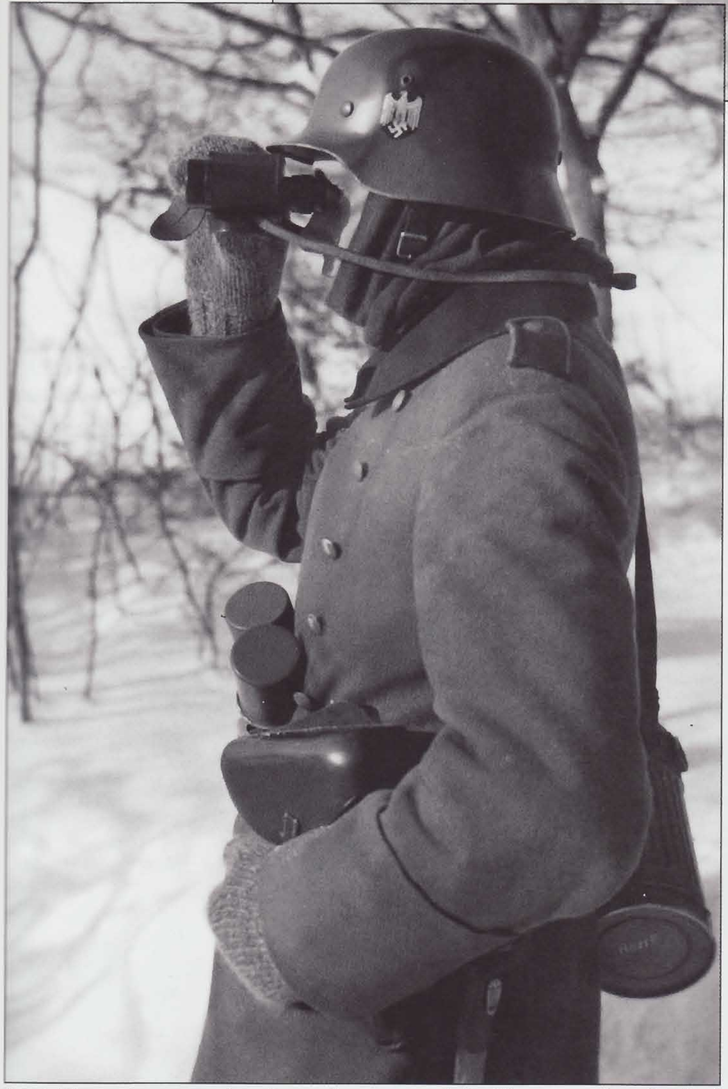
A 9mm MP40 machine pistol-armed scout makes his way past a mired T-34/76. The boxy objects over the rear fenders are auxiliary fuel tanks that would normally be discarded in combat. German troops would habitually drain the much needed fuel from knocked out and abandoned vehicles.



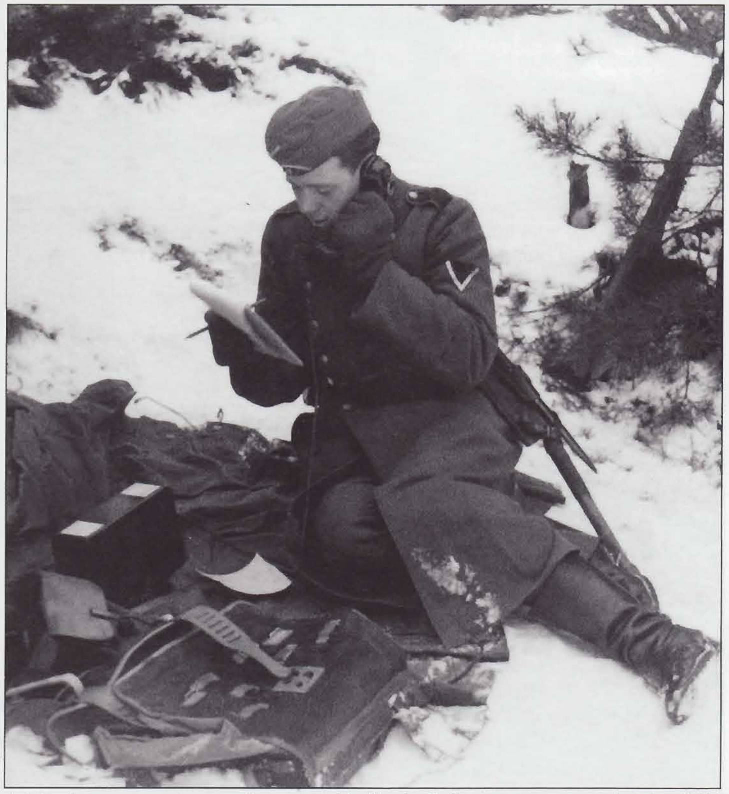
A rifleman prepares to fire through a trench parapet embrasure. In the background an abandoned T-34/76 tank has been dug in as a static pillbox. The Germans called the T-34 a Tee-Salon (tea salon).



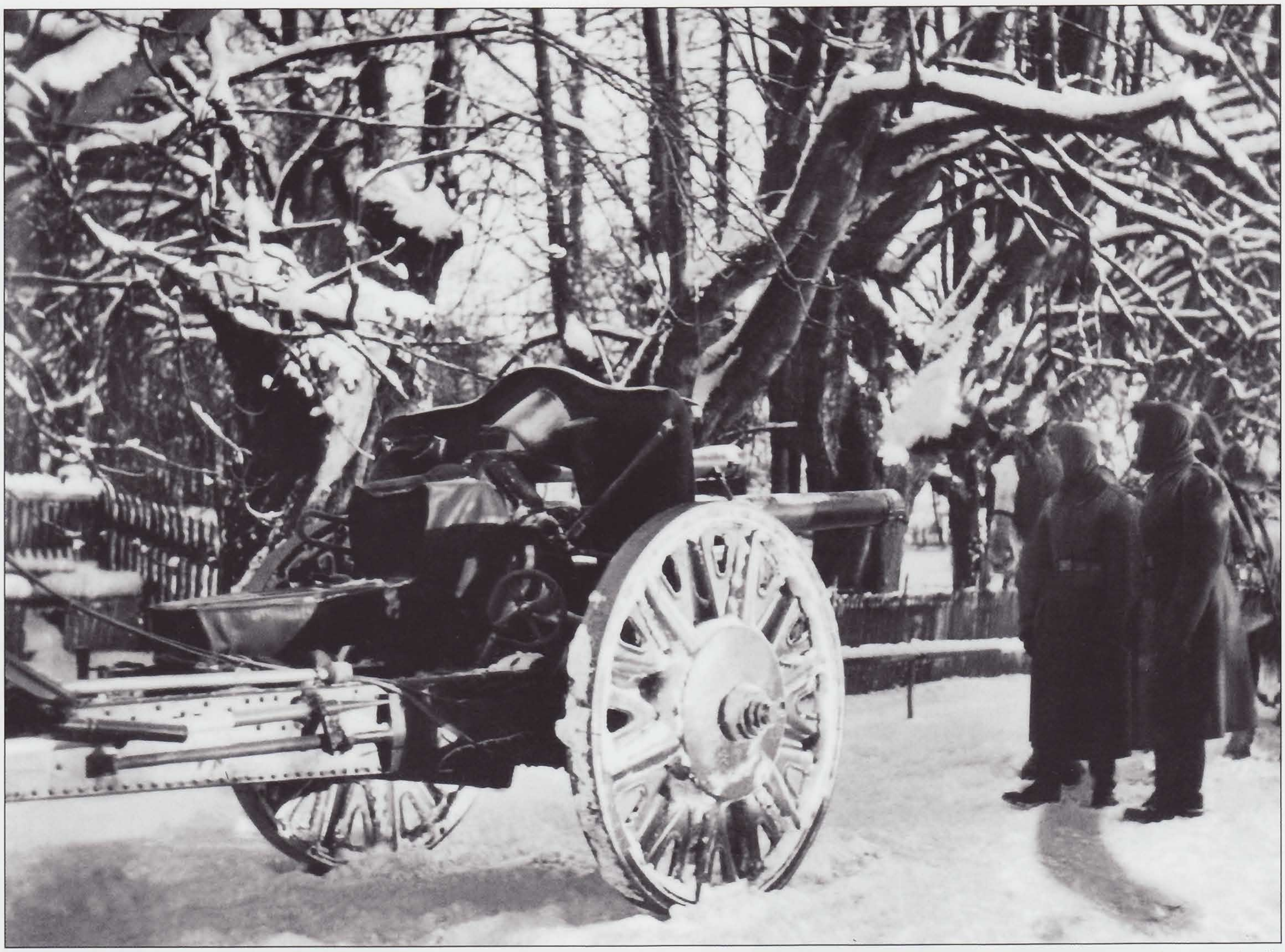
This 5cm Pak 38 antitank gun has had its wheels mounted on large purpose-built "snow skies" to allow it to be moved easily over snow. It could be manhandled forward on its skies or towed behind a vehicle. The gun has been whitewashed and the crew wears their reversible insulated suits white-side out. However, note how dingy the uniforms have become because of the fact they were seldom if ever removed during the entire winter and never washed. They soon lost their camouflaging ability. Off-white or near-white is just as conspicuous on pristine snow as a field gray uniform.



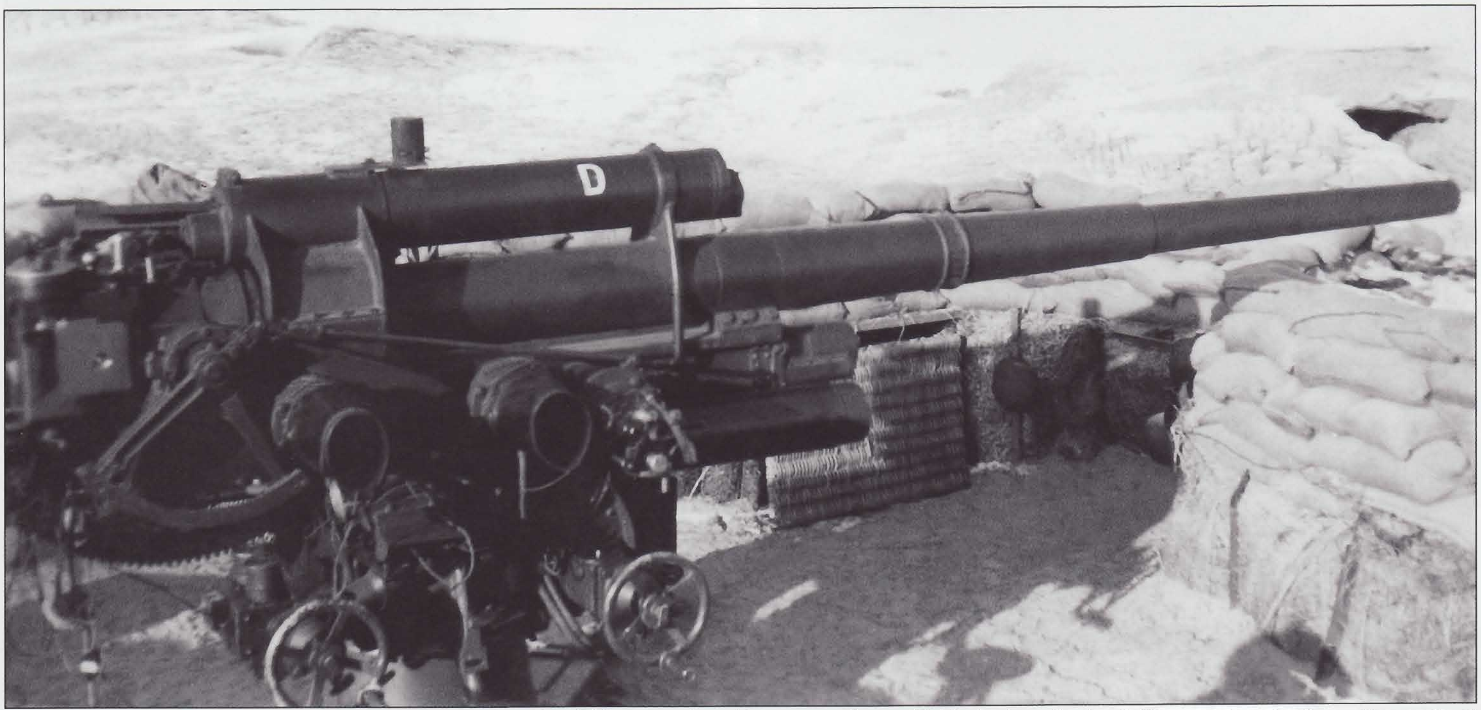
An artilleryman scans for signs of enemy activity. He wears the standard winter uniform, the regular woolen M36 tunic and trousers, woolen knit sweater, greatcoat, knitted torque beneath the steal helmet, and knitted gloves. While adequate for the comparatively mild German winter, it was next to worthless during the brutal Russian winter. His branch is identified by the bright red Waffenfarbe shoulder strap piping.



A telephone operator sends a report to the battalion message center. In static situations telephones were the main means of communications. They were reliable, simple to operate, and could not be intercepted like radio transmissions. Lines could be tapped, but this required infiltration behind forward positions and little usable information could be obtained and relayed to higher headquarters for action. Telephone lines did require a great deal of maintenance owing to them being cut by enemy patrols, shell fire, and most commonly, one's own vehicles. The standard field telephone was the Feldfernsprecher 33. The white squares on the top of the telephone are the data plate and another plate printed with the phonetic alphabet. Beside the operator lies a telephone pack (Feldfernsprechtornister) with lineman tools and repair parts.



A 10.5cm l.FH18 light field howitzer attached to is limber. It could be towed by a team of six horses, a truck, or a 3-ton halftrack depending on the type of unit. Most were merely horse-drawn as here. The standard division had three battalions of these pieces organized into three four-gun batteries to total 36 howitzers.



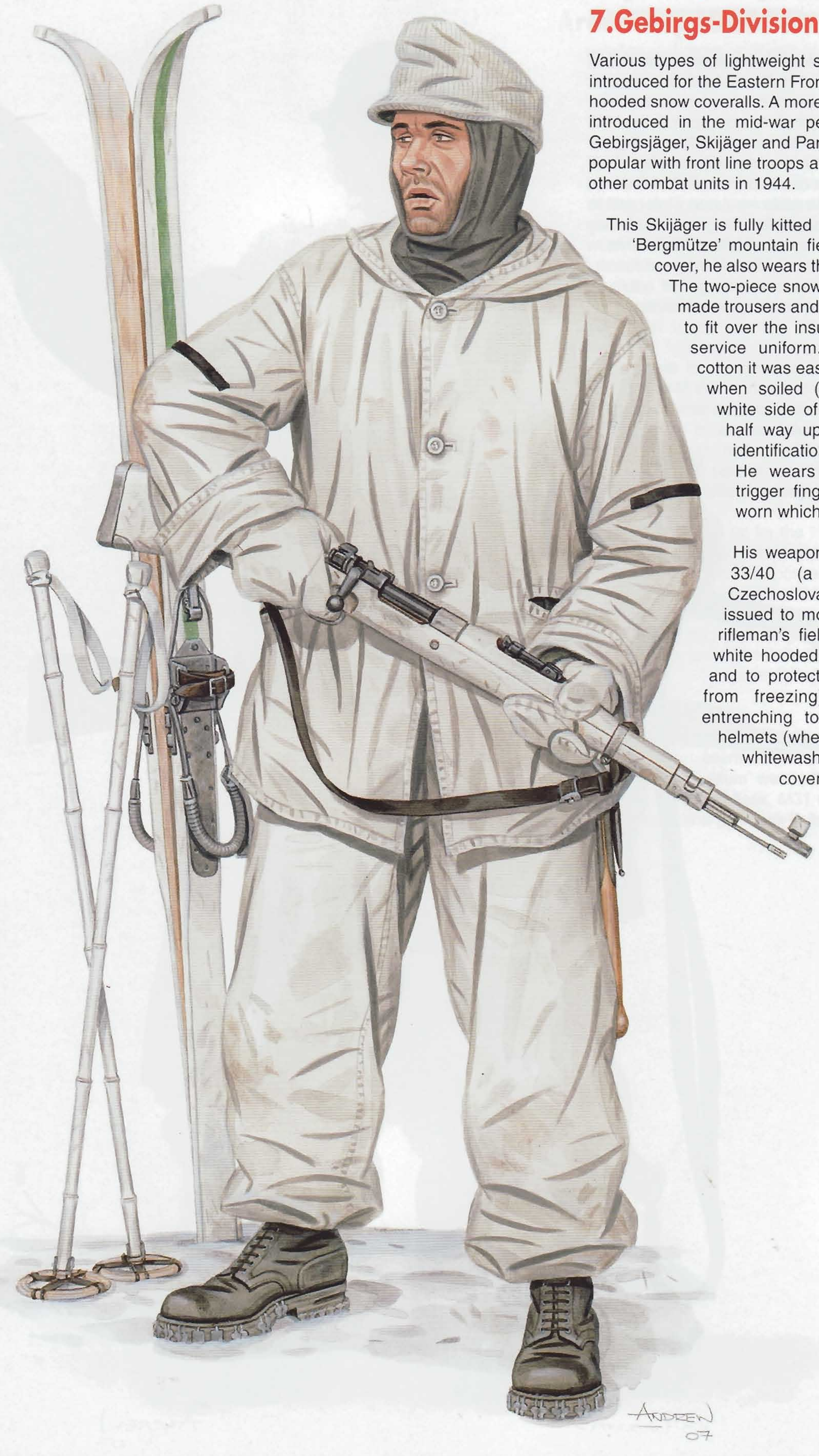
A well ordered 8.8cm Flak 18 in set up in its firing position. This type of position was called a “Feldmässiger Ausbau”. The gun is actually resting on level ground rather than being dug into the frozen ground with the snow cleared away and a parapet built up of hay bales and sandbag banked with snow. The sandbags, being the most resilient, are placed higher up for protection atop the hay bales. There were four guns to a battery, designated A to D or Anton, Berta, Cäsar, and Dora in the phonetic alphabet. The same applied to field artillery batteries.

Gefreiter, Ski-Battalion 82, 7.Gebirgs-Division, Lapland, 1943

Various types of lightweight snow camouflage garments were introduced for the Eastern Front; from improvised white outfits to hooded snow coveralls. A more practical two-piece snowsuit was introduced in the mid-war period; priority issue went to the Gebirgsjäger, Skijäger and Panzergrenadiers. The snowsuit was popular with front line troops and became increasingly issued to other combat units in 1944.

This Skijäger is fully kitted out in snow warfare clothing; his 'Bergmütze' mountain field cap has a white camouflage cover, he also wears the gray woolen toque on his head. The two-piece snowsuit is worn, consisting of simply made trousers and hooded jacket. It was loose fitting to fit over the insulated winter suit and/or the field service uniform. Made from lightweight white cotton it was easily washable and dried off quickly when soiled (a major disadvantage with the white side of the insulated winter suit). Worn half way up the arms was sewn on black identification strips (they also came in red). He wears padded white mittens with a trigger finger. Cleated mountain boots are worn which had a duel function as ski boots.

His weapon is a whitewashed 7.9mm Gew 33/40 (a German modified pre-war Czechoslovak carbine), it was exclusively issued to mountain and ski troops. Standard rifleman's field equipment is worn under the white hooded jacket (for camouflage reasons and to protect the field flask and ammunition from freezing). Partly seen is the small entrenching tool and S84/98 bayonet. Steel helmets (when worn) were normally painted in whitewash or worn with a white camouflage cover. Beside him are regulation German army skis (in white - with their distinctive green central stripe) and white painted ski poles.

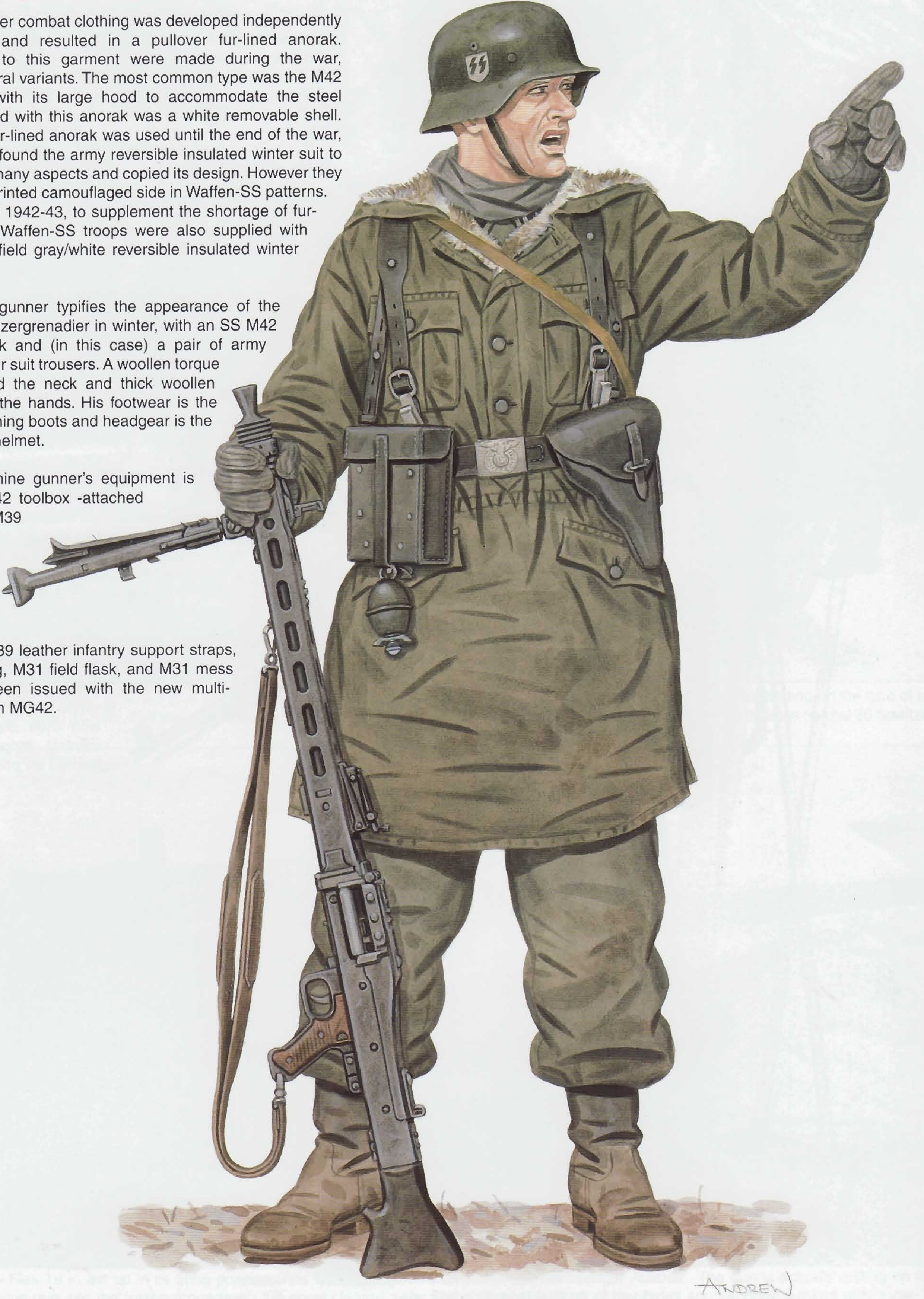


SS-Sturmann, SS Panzergrenadier 'Das Reich', Kharkov, 1943

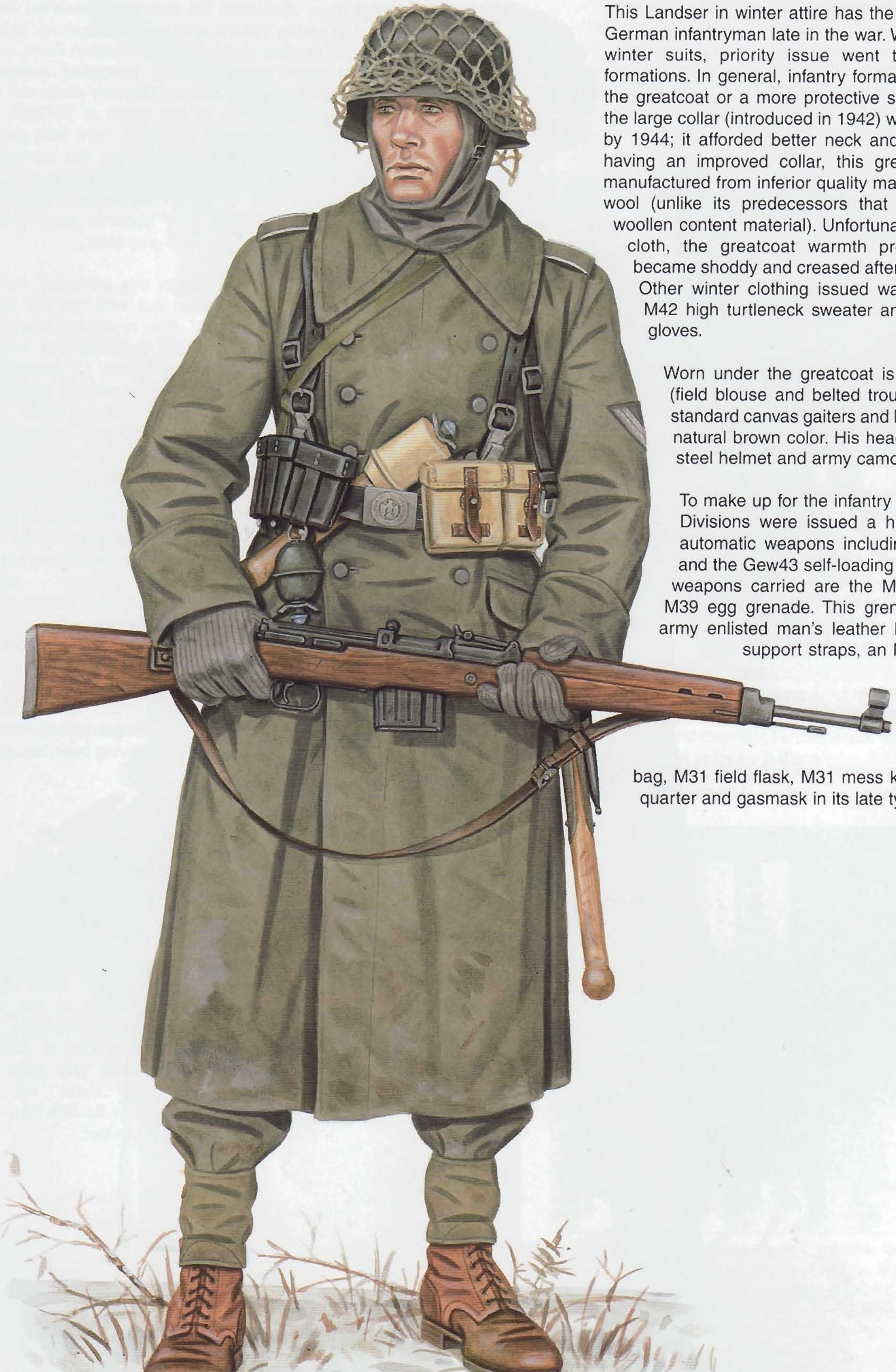
Waffen-SS winter combat clothing was developed independently for the army and resulted in a pullover fur-lined anorak. Improvements to this garment were made during the war, leading to several variants. The most common type was the M42 pullover type with its large hood to accommodate the steel helmet. Included with this anorak was a white removable shell. Although the fur-lined anorak was used until the end of the war, the Waffen-SS found the army reversible insulated winter suit to be superior in many aspects and copied its design. However they produced the printed camouflaged side in Waffen-SS patterns. In the winter of 1942-43, to supplement the shortage of fur-lined anoraks, Waffen-SS troops were also supplied with the new army field gray/white reversible insulated winter suit.

This machine gunner typifies the appearance of the Waffen-SS Panzergrenadier in winter, with an SS M42 fur-lined anorak and (in this case) a pair of army reversible winter suit trousers. A woollen torque is worn around the neck and thick woollen gloves protect the hands. His footwear is the standard marching boots and headgear is the M40 SS steel helmet.

Standard machine gunner's equipment is worn; the MG42 toolbox -attached to this is an M39 egg grenade, a P38 pistol in its 'hardshell' holster, SS enlisted man's leather belt, M39 leather infantry support straps, M31 bread bag, M31 field flask, and M31 mess kit. He has been issued with the new multi-purpose 7.9mm MG42.



Obergefreiter, 26.Volksgrenadier-Division, Ardennes, 1944



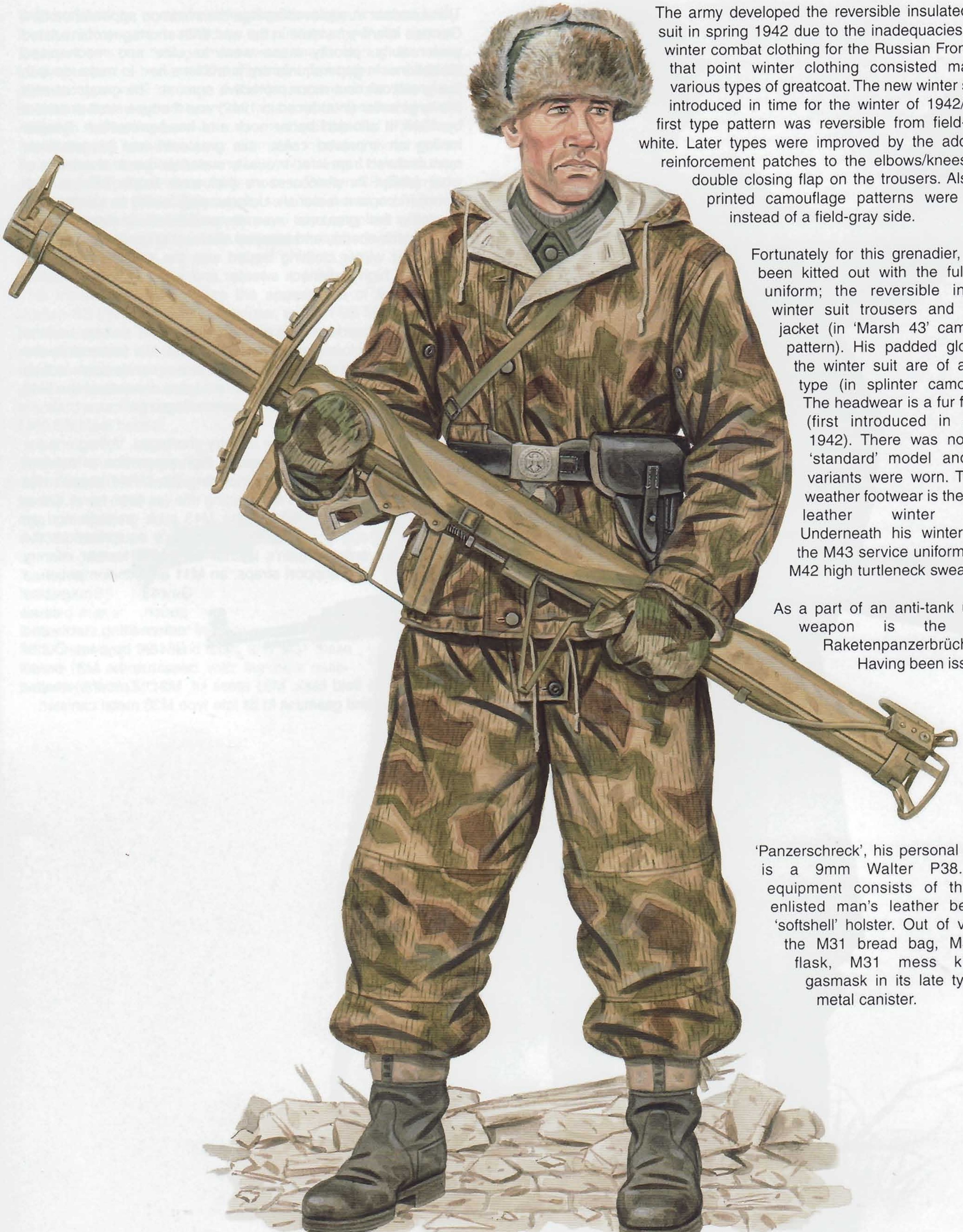
This Landser in winter attire has the common appearance of a German infantryman late in the war. With shortages of insulated winter suits, priority issue went to elite and mechanised formations. In general, infantry formations had to make do with the greatcoat or a more protective surcoat. The greatcoat with the large collar (introduced in 1942) was the type most prevalent by 1944; it afforded better neck and head protection. Despite having an improved collar, this greatcoat was progressively manufactured from inferior quality materials due to shortages of wool (unlike its predecessors that were made from a high woollen content material). Unfortunately owing to substandard cloth, the greatcoat warmth properties declined and it became shoddy and creased after a short period in the field. Other winter clothing issued was the woollen torque, an M42 high turtleneck sweater and a set of heavy woollen gloves.

Worn under the greatcoat is the M43 service uniform (field blouse and belted trousers). His footwear is the standard canvas gaiters and lace-up ankle boots in their natural brown color. His headgear consists of the M42 steel helmet and army camouflage net.

To make up for the infantry shortages, Volksgrenadier Divisions were issued a high proportion of modern automatic weapons including the MP44 assault rifle and the Gew43 self-loading rifle (as seen here). Other weapons carried are the M43 stick grenade and an M39 egg grenade. This grenadier's equipment is: the army enlisted man's leather belt, M39 leather infantry support straps, an M11 ammunition pouch, a Gew43 magazine pouch, a small entrenching tool and S84/98 bayonet. Out of view are the M31 bread bag, M31 field flask, M31 mess kit, M31 (*Zeltbahn*) shelter quarter and gasmask in its late type M38 metal canister.

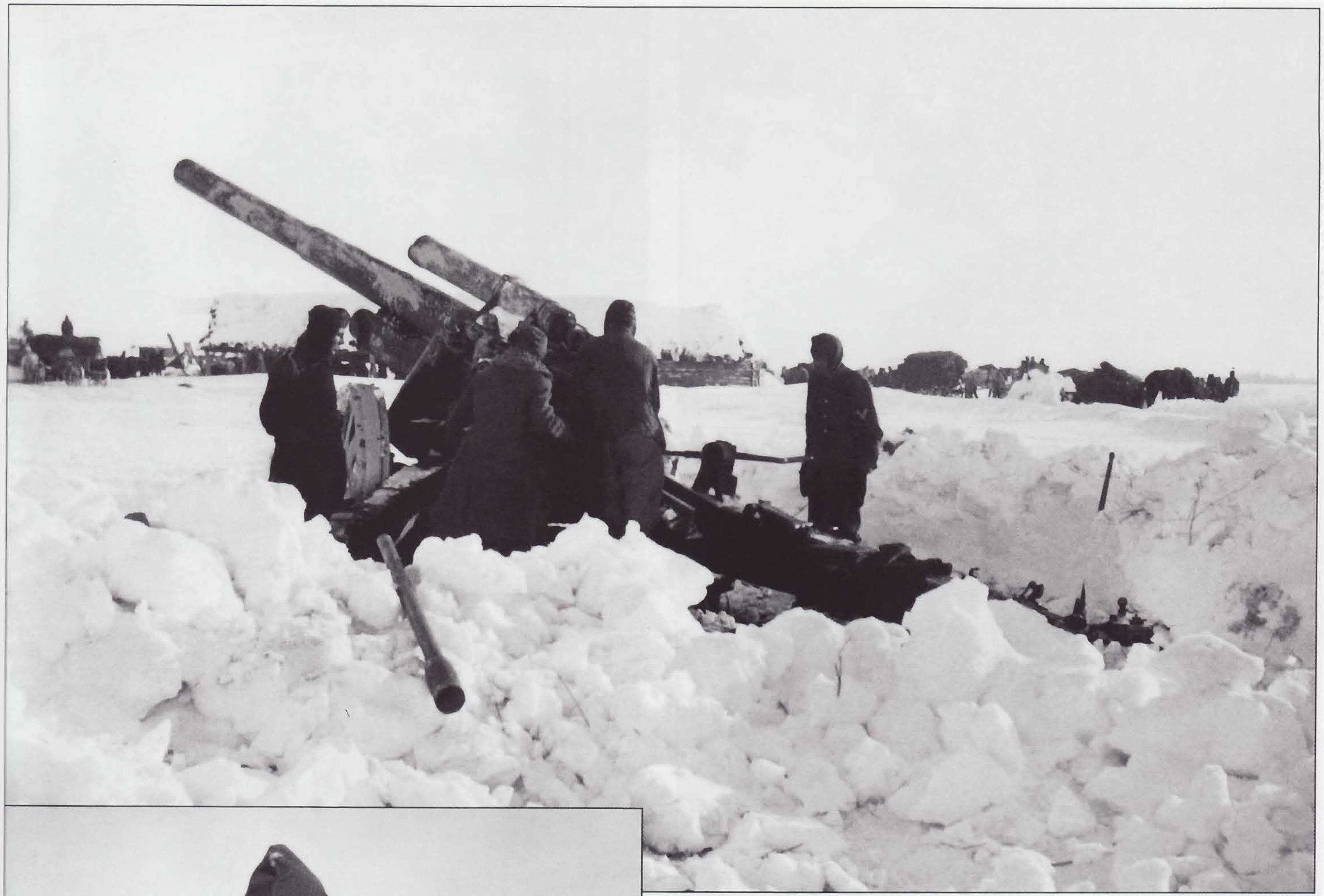
Obergrenadier, 609.Infanterie-Division, Breslau, 1945

The army developed the reversible insulated winter suit in spring 1942 due to the inadequacies of their winter combat clothing for the Russian Front. Up to that point winter clothing consisted mainly of various types of greatcoat. The new winter suit was introduced in time for the winter of 1942/43; this first type pattern was reversible from field-gray to white. Later types were improved by the addition of reinforcement patches to the elbows/knees and a double closing flap on the trousers. Also army printed camouflage patterns were utilized instead of a field-gray side.

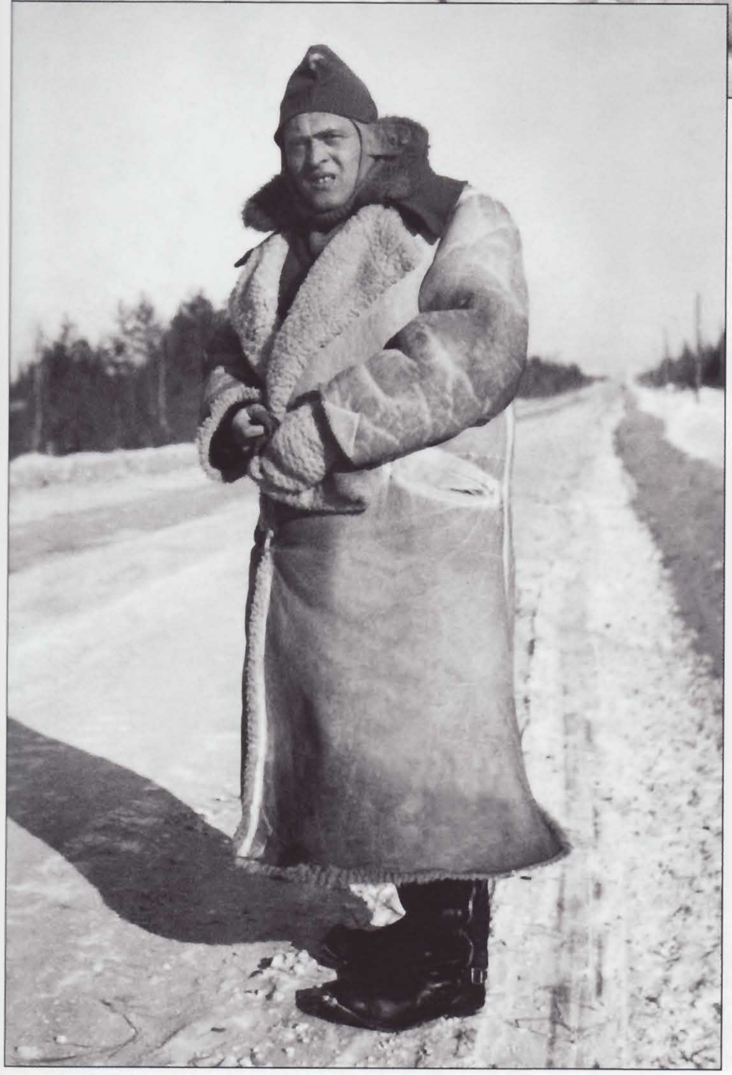


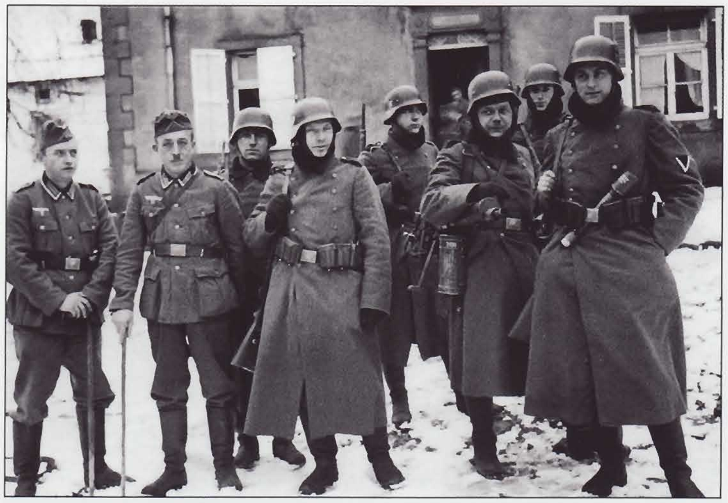
Fortunately for this grenadier, he has been kitted out with the full winter uniform; the reversible insulated winter suit trousers and hooded jacket (in 'Marsh 43' camouflage pattern). His padded gloves for the winter suit are of an older type (in splinter camouflage). The headwear is a fur field cap (first introduced in Autumn 1942). There was no official 'standard' model and many variants were worn. The cold weather footwear is the felt and leather winter boots. Underneath his winter suit is the M43 service uniform and an M42 high turtleneck sweater.

As a part of an anti-tank unit, his weapon is the 8.8cm Raketenpanzerbrüchse 54. Having been issued the 'Panzerschreck', his personal weapon is a 9mm Walter P38. Other equipment consists of the army enlisted man's leather belt, P38 'softshell' holster. Out of view are the M31 bread bag, M31 field flask, M31 mess kit, and gasmask in its late type M38 metal canister.



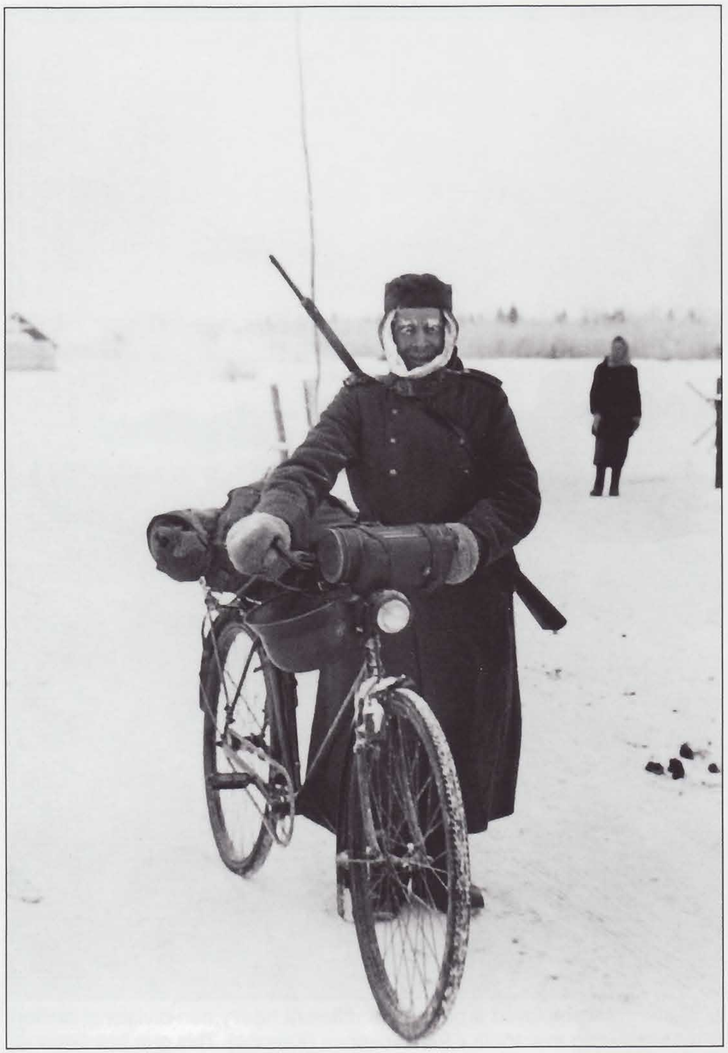
The Germans employed a number of different heavy non-divisional artillery pieces including this 15cm s.FH18 cannon (Kanone). This gun has been set up on level ground cleared of snow, which was piled as a parapet. It has been whitewashed in a splotchy pattern.



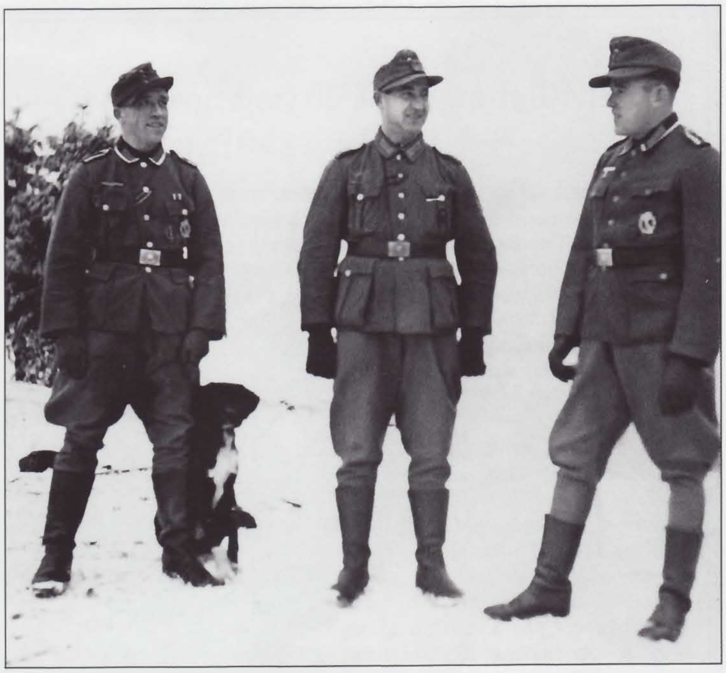


This group (squad) appears to be some form of second-line unit such as security units (Sicherungseinheiten) or state rifle units (Landsschützen-Einheiten). Note the 7.92mm MG08/15 light machine gun dating from World War I carried by the third man from the right.

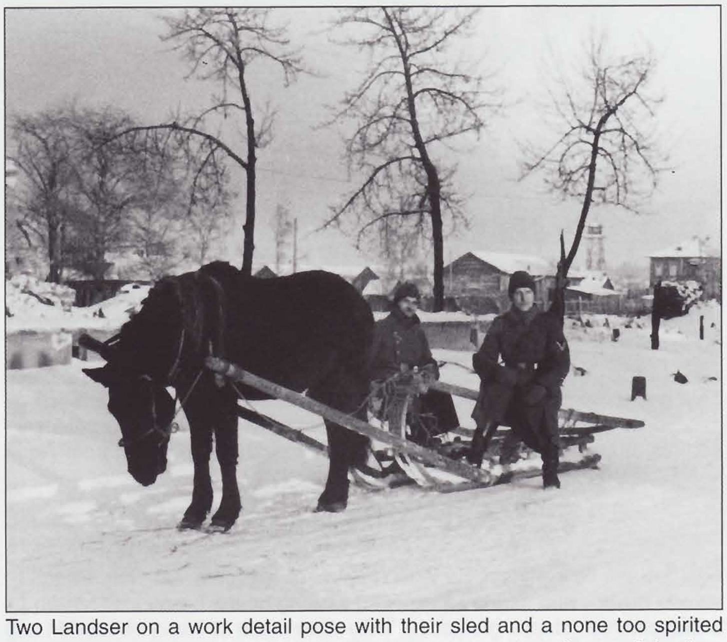
Besides use by sentries, the Wachmantel (guard greatcoat) was issued to vehicle drivers who had to sit exposed for long hours. It was also known as a Steppmantel (steppe greatcoat). They were made of heavy sheepskin and natural tan in color. Sometimes issue woolen greatcoats were lined with fur for the same use. This driver also wears thick woolen mittens.



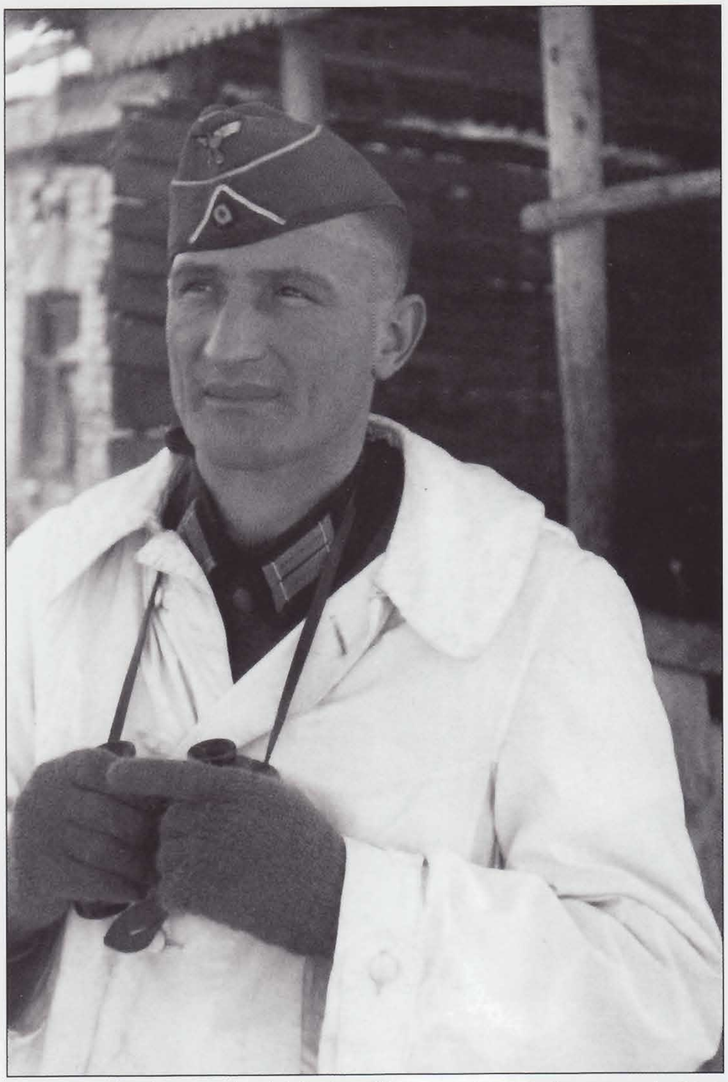
Bicycles were still usable on the snow so long as it was hard-packed, especially on roads and trails. The Truppenfahrrad 38 (troop bicycle) was the standard issue model and might be found painted field gray or black. Many models of civilian bicycles were commandeered.



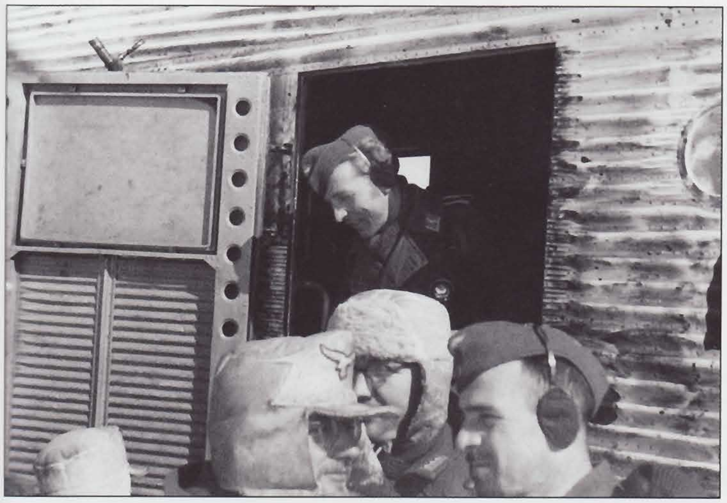
Two Unteroffiziere (corporals) flank a Gefreiter (senior private). All three wear the black Wound Badge on the left breast pocket, indicating one to three wounds. The two Unteroffiziere also wear the Infantry Assault Badge. They wear the issue field gray woolen knitted gloves. Without a leather or canvas shell they were inadequate as they did not block the wind or trap heat.



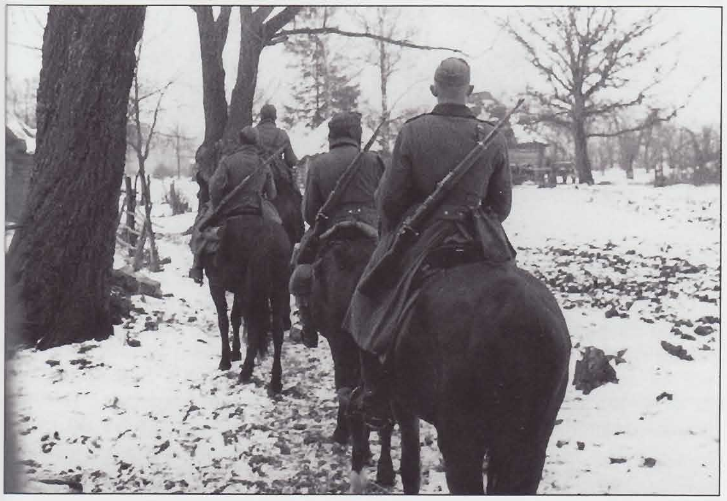
Two Landser on a work detail pose with their sled and a none too spirited pony. This type of sled was used for hauling loads such as firewood, lumber, and crates.



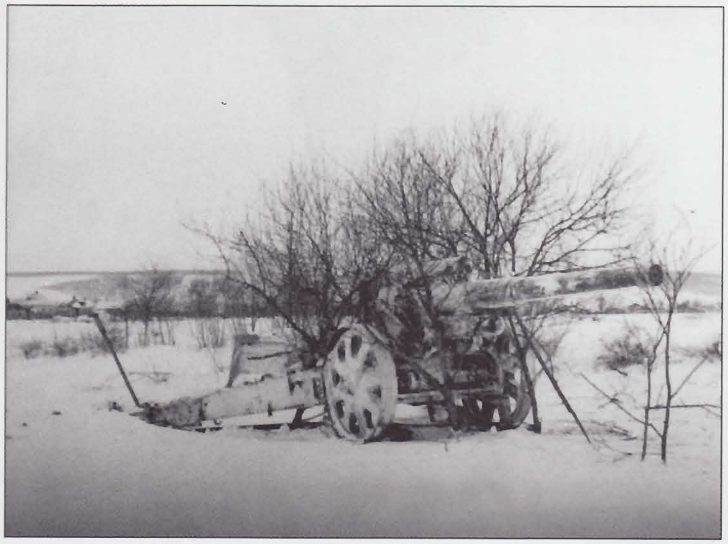
An immaculately turned out infantry officer wearing what appears to be a custom-made snow camouflage jacket.



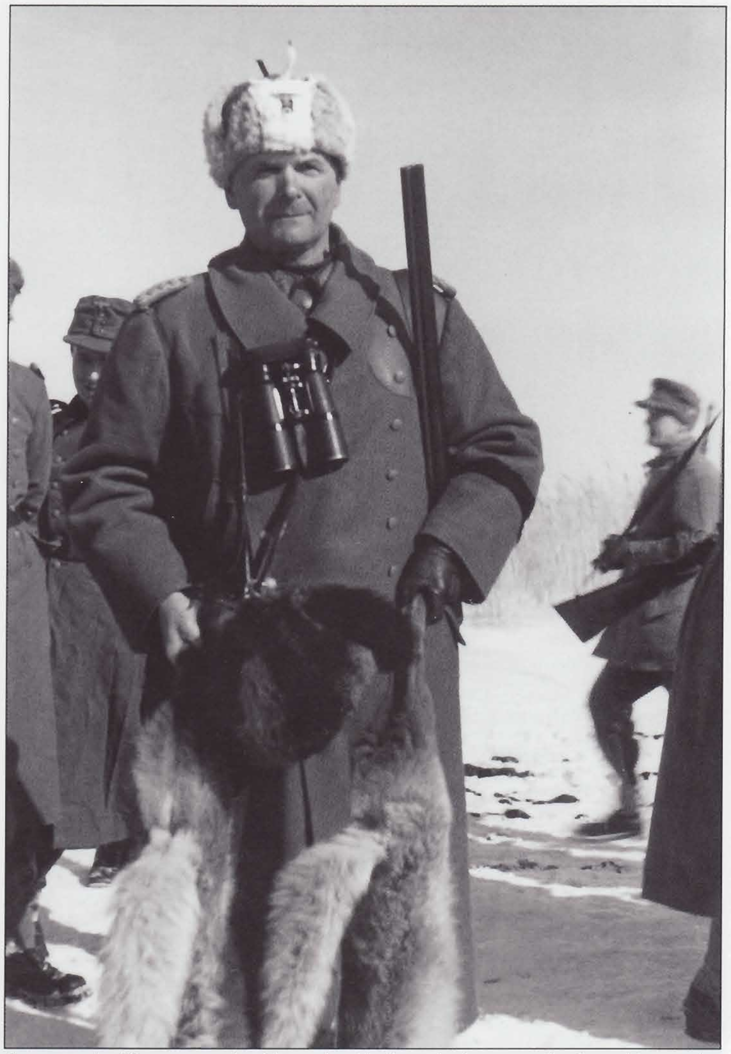
Luftwaffe personnel debark from a Junkers Ju 52 transport. Note the old style earmuffs worn by one man, which would be of little value. The muzzle of a 7.92mm MG15 machine gun mounted in a side port can be seen above the door.



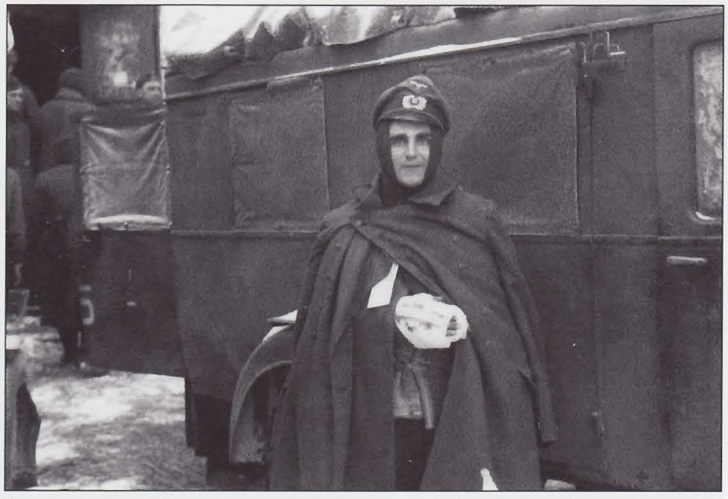
A mounted patrol carrying their 7.92mm Kar 98k carbines in the prescribed manner for mounted troops. Owing to the lack of belt equipment or gear carried behind their saddles they are probably on a short-duration foraging detail.



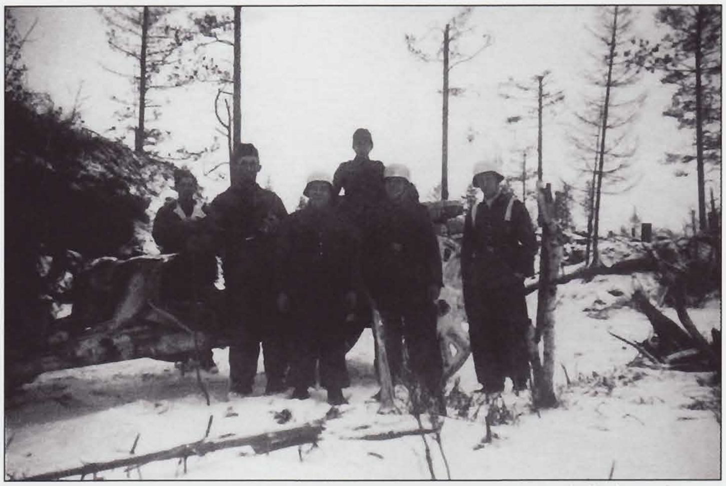
Divisional heavy artillery was assigned to a single battalion with two four-gun batteries of 15cm s.FH18 heavy field howitzers (schwere Feldhaubitze) as pictured here. Its irregular whitewash paint and the stacked saplings were sufficient to prevent its detection by fast flying aircraft. The battalion also had a battery of four 10cm K18 heavy field gun (schwere Feldkanonen) used for long-range counterbattery fire. It appeared almost identical to this 15cm, but had a smaller caliber and much longer barrel.

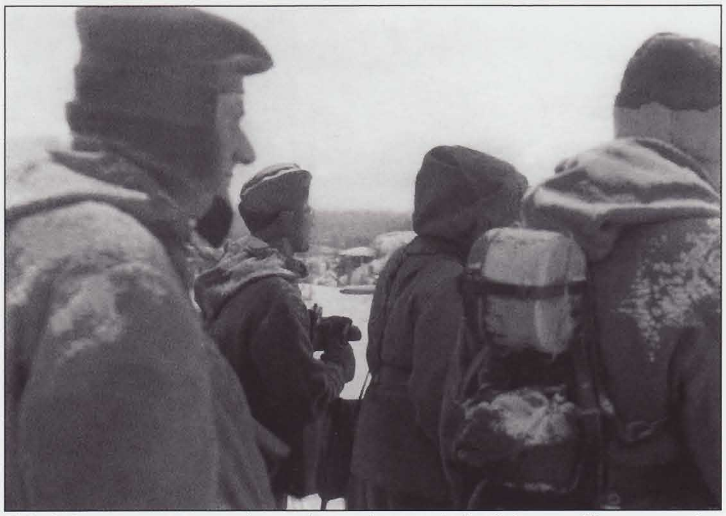


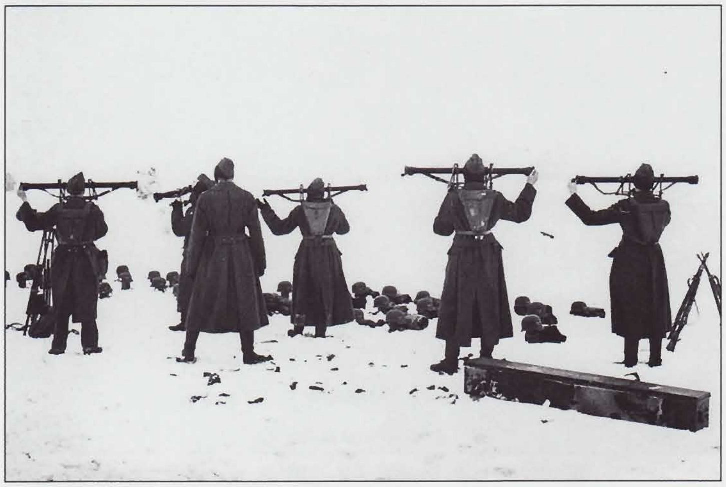
A general officer armed with a double-barrel shotgun displays his trophy foxes taken on a hunt. He carries one of the many non-standard types of binoculars that were in common use. Note the leather reinforcing patches on the greatcoat's shoulders. These were common.

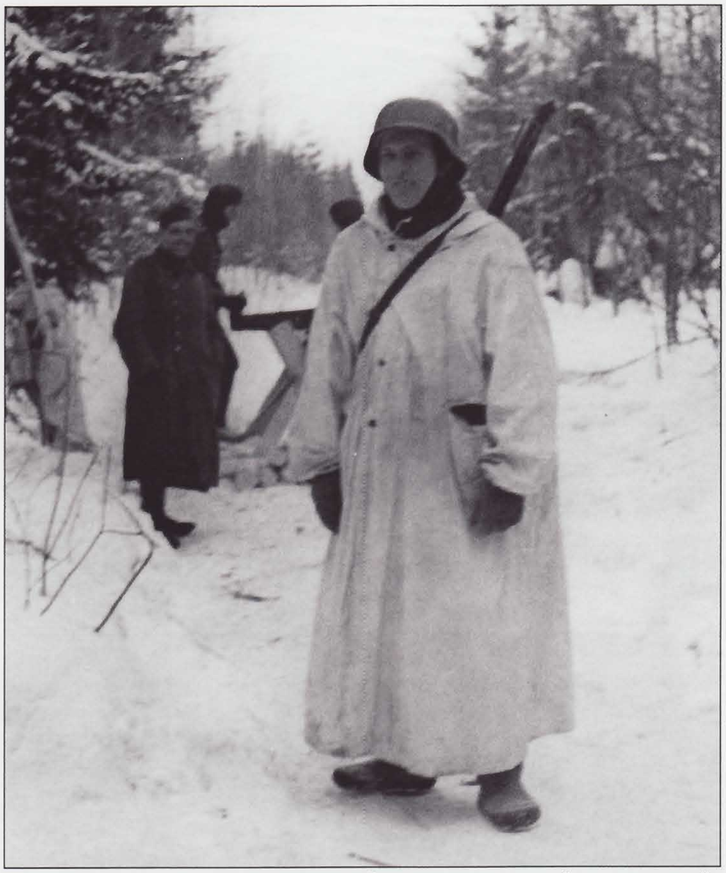


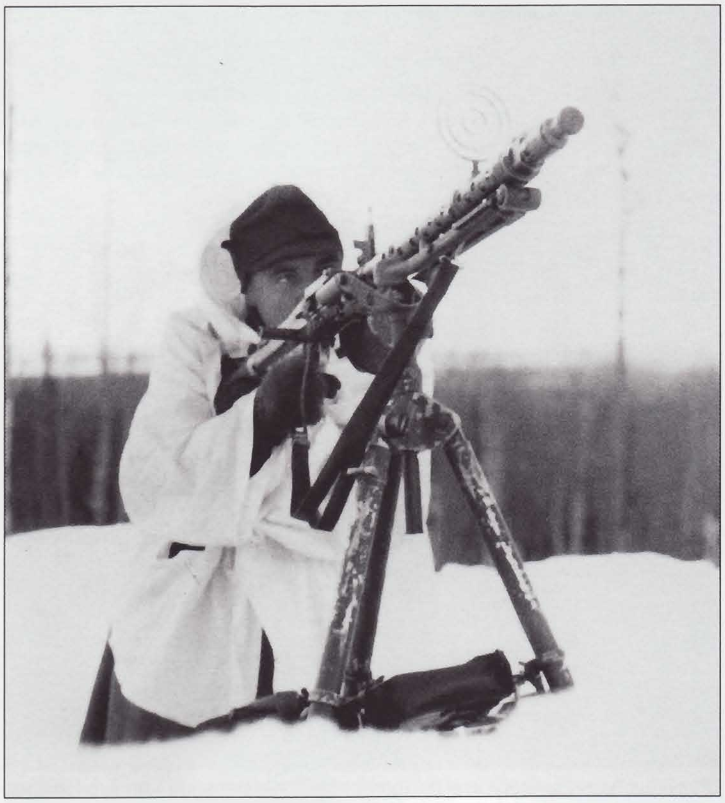
A wounded officer stands beside an ambulance (Krankenkraftwagen). Blackout curtains have been fixed over the side windows. Wearing two greatcoats, as this man does, was a common practice if a larger one could be found. His wound tag can be seen attached to one of the greatcoats. He wears the old style officer's soft field cap.

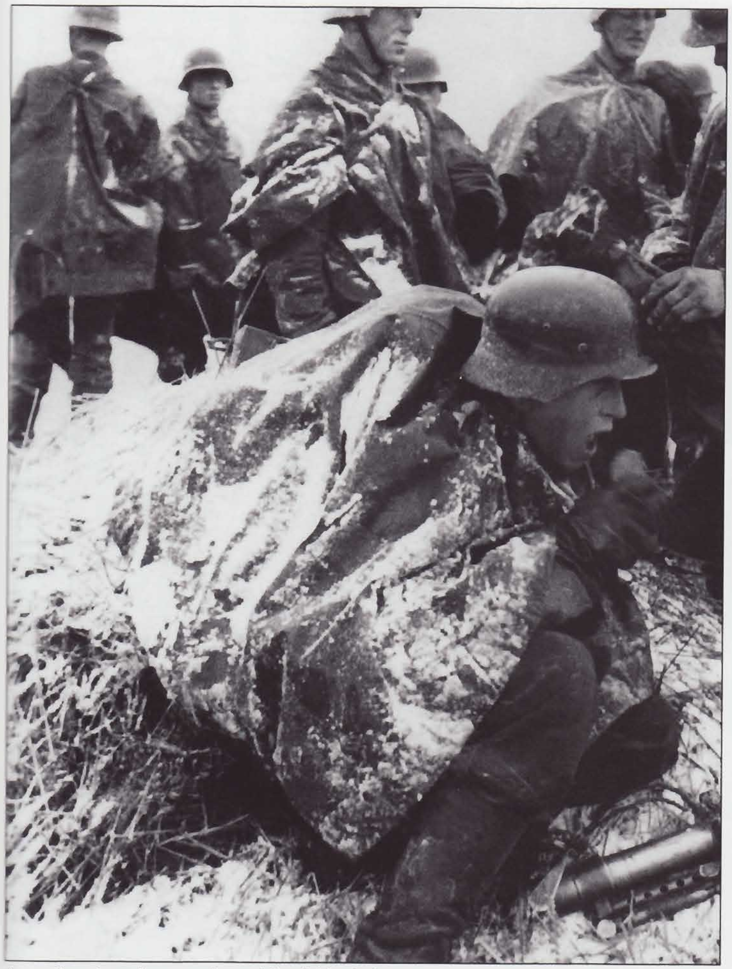

The crew of a 10.5cm l.FH18 field howitzer pose beside their limbered gun.


This infantryman wears the web combat pack for infantry rifle companies (Gefechtsgepäck für Infanterie Schützenkompanien) with his cook pot (mess kit) and combat pack bag for small personal items attached.

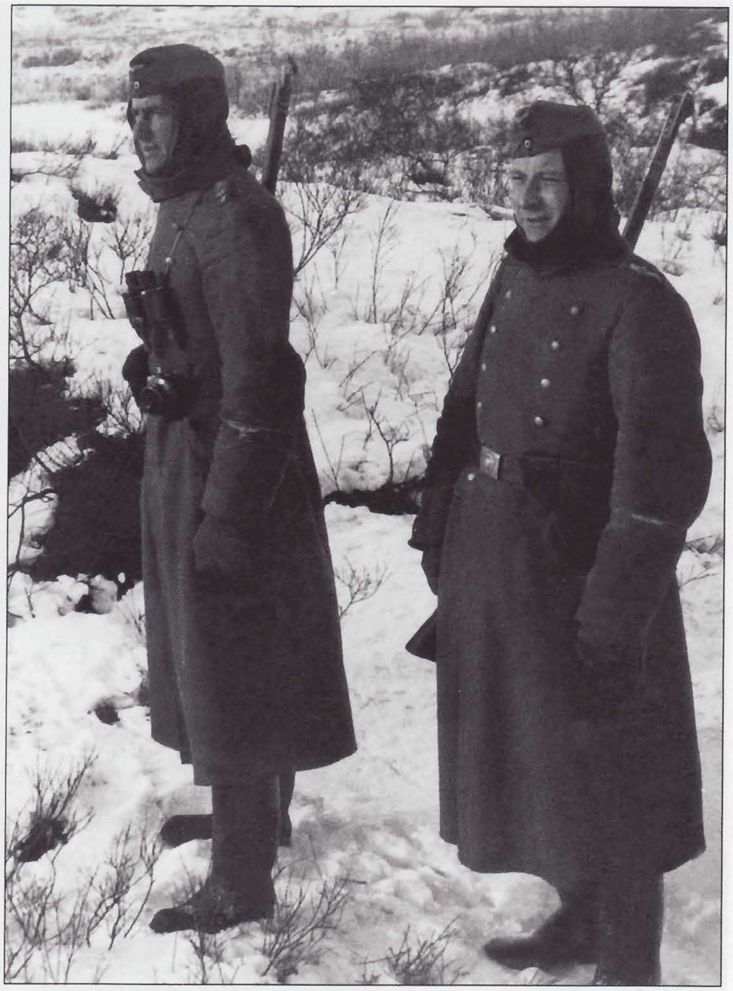

A field training school for 2cm or 3.7cm Flak gun aimers. They are training with the 1-meter Em.R. stereoscopic rangefinder. The triangular tan or brown leather cases on their backs are for the folding shoulder rests. The rangefinder itself would be slung over the shoulder by a carrying sling.


This rifleman wears the coat-like snow camouflage coveralls (Schneetarnanzug). While similar in design to a greatcoat, it was only a layer of thin linen adding nothing to insulation. He is armed with a 7.92mm Kar 98a carbine dating from World War I. In the background is a never-ending wood cutting detail.

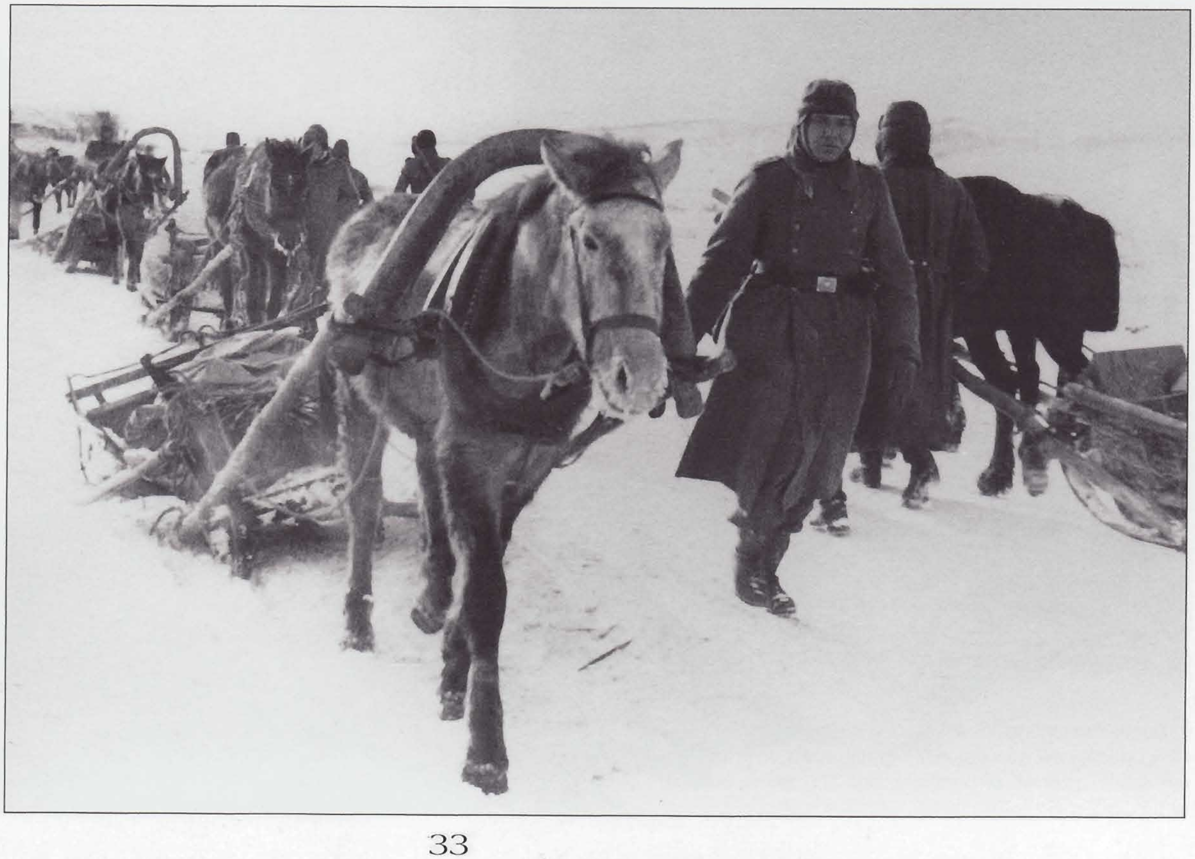

A 7.92mm MG34 machine gun set up on a Dreifuss 34 antiaircraft tripod and fitted with an antiaircraft ring sight and a 50-round belt drum magazine. Headquarters and support units possessed a small number of machine guns for ground and air defense. Each artillery battery had two such machine guns, each with a dedicated gunner. Additional crewmen were detailed from the battery.



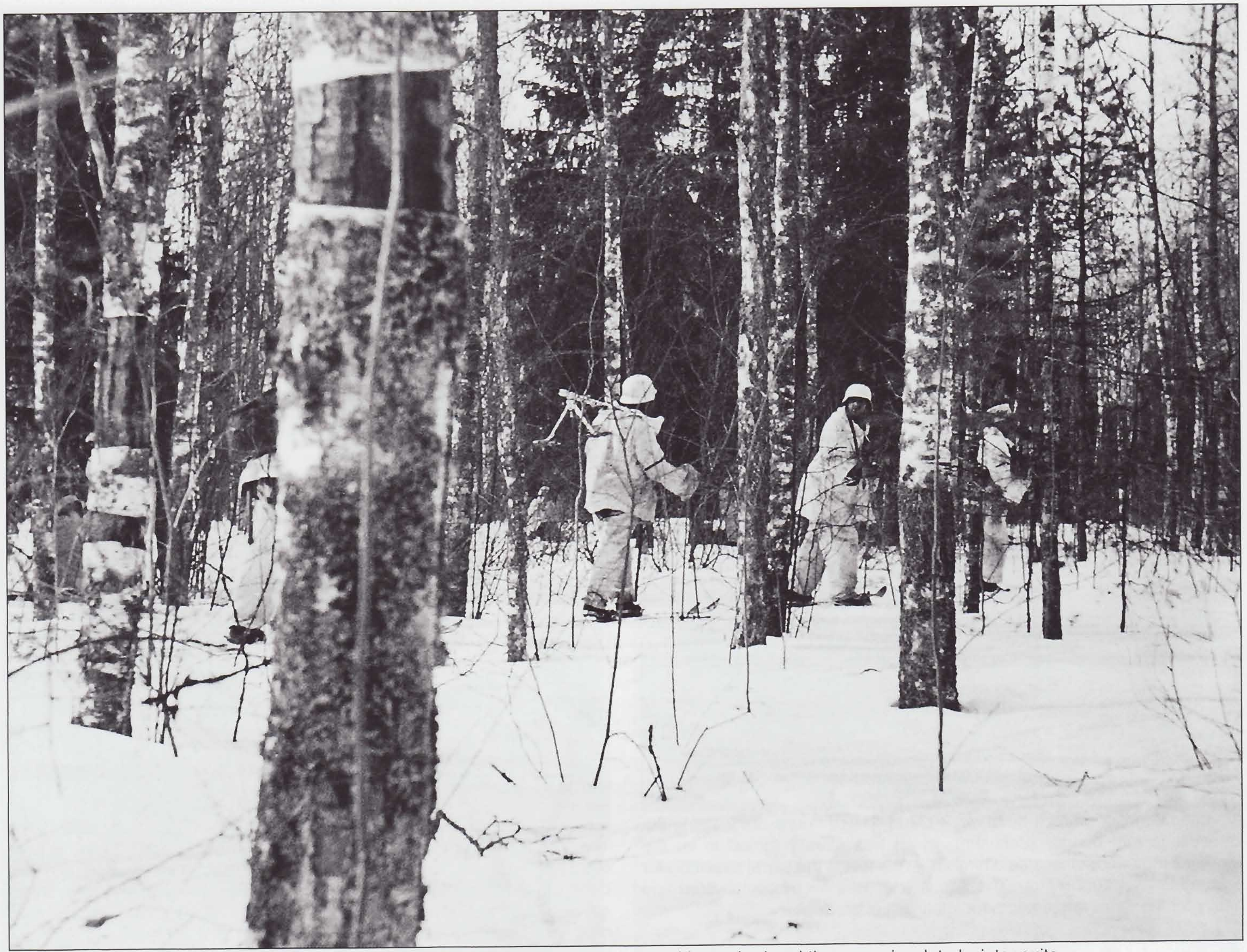
A resting Landser grabs a bit of black bread. These troops are wearing the camouflage tent quarter (Zeltbahn), which was usually turned in for the winter as they were otherwise often lost. At his feet is the barrel assembly for a 5cm l.GrW34 light mortar. The little mortar was overly complicated and heavy for the short-range and poor lethality it offered.



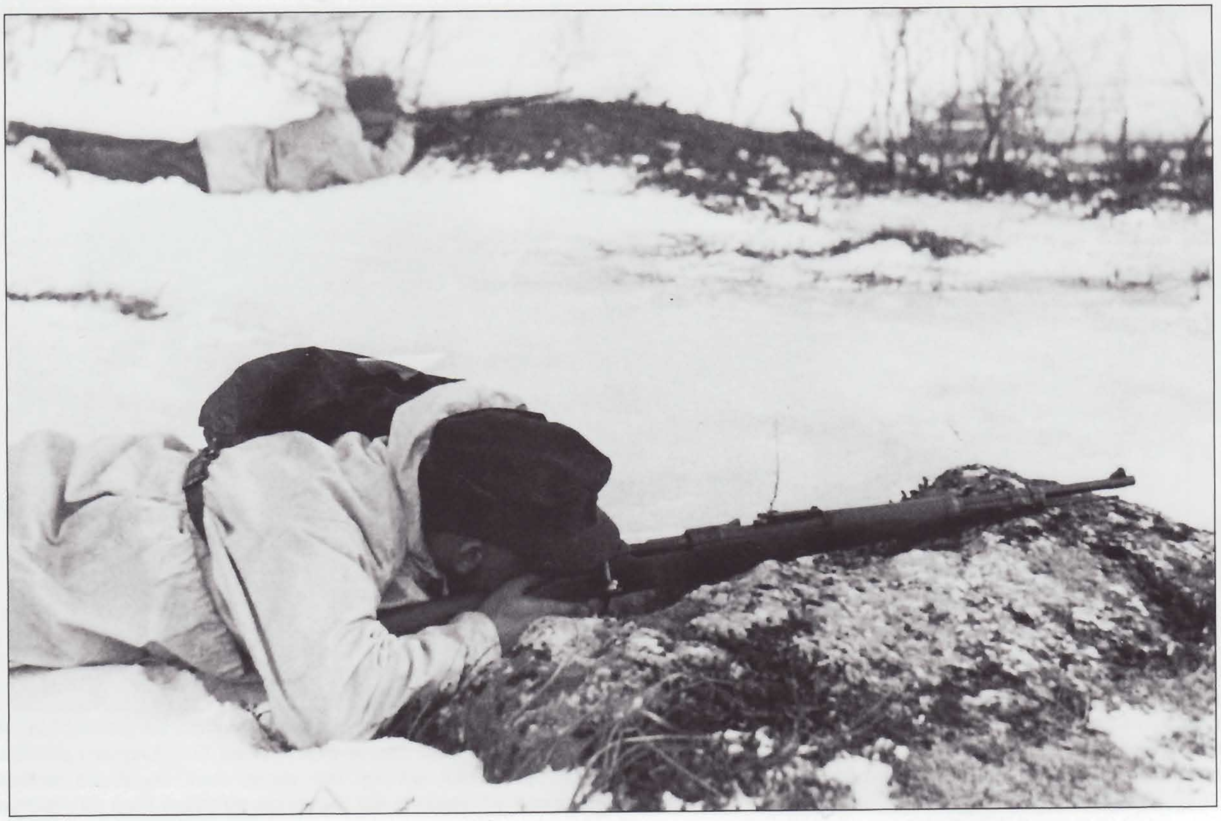
These two soldiers appear to be some type of locally raised security unit, common in Russia. Their caps bear the Heer eagle and roundel and belt buckle, but there is a Waffen-SS type of eagle above the left cuff plus unusual shoulder straps of insufficient detail. The Waffen-SS eagle was usually worn on the left upper sleeve. They are armed with 7.92mm Kar 98a World War I carbines.



A continuous column of sleds and horses kept the front supplied in areas lacking roads capable of bearing motor vehicles or where the snow was simply too deep for vehicles. The horses are small Russian Bashkir ponies.

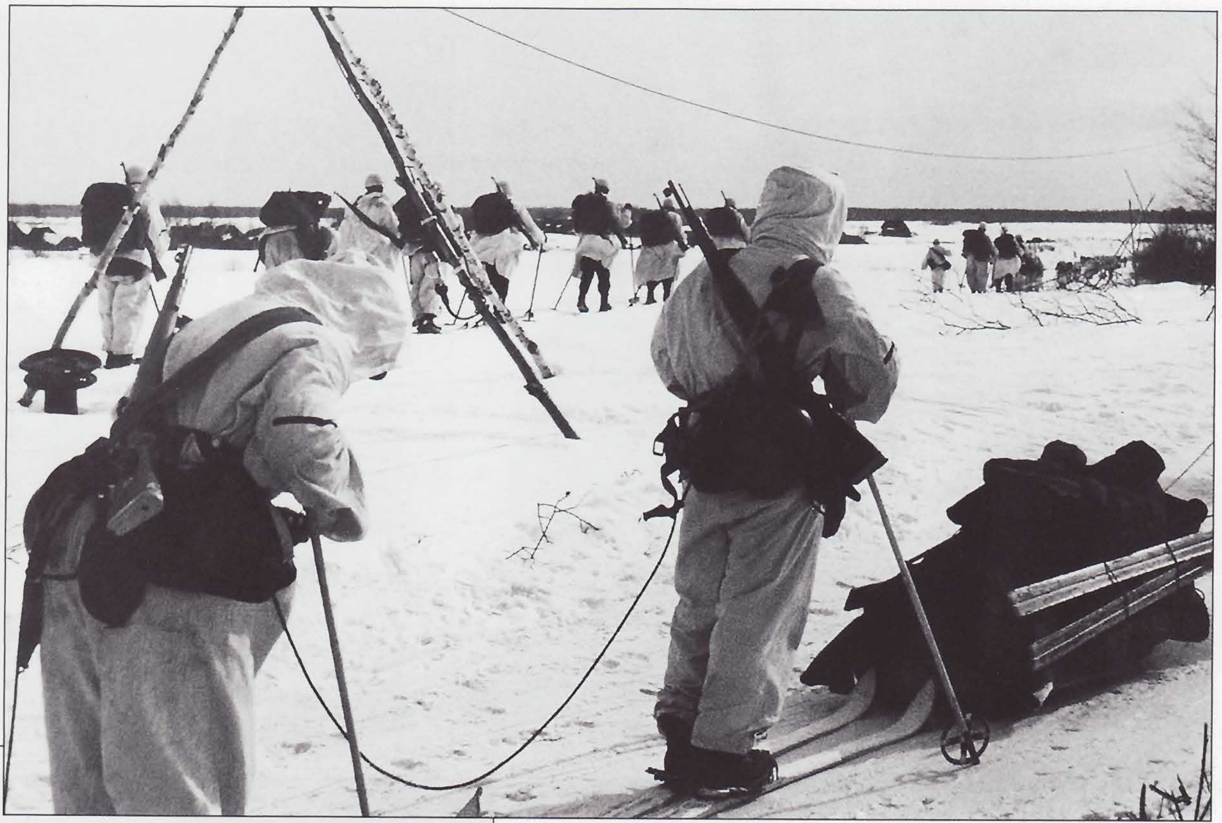


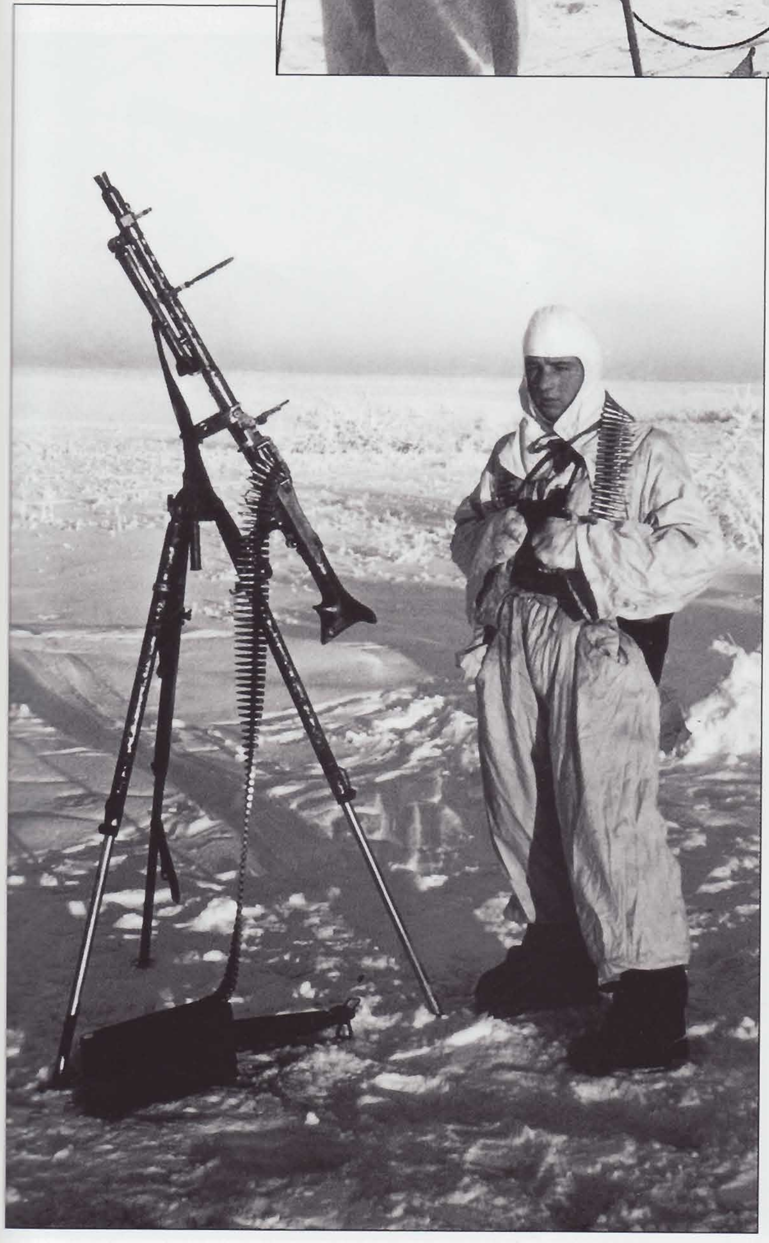
A patrol moves through a grove of birch trees. Their MG34 machine gun has been whitewashed and they wear insulated winter suits.

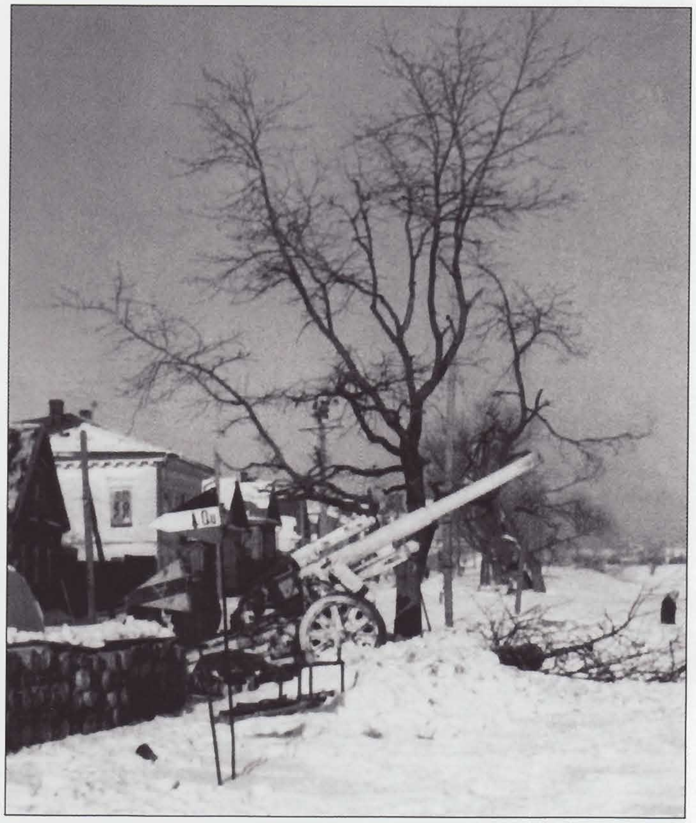


Jäger troops take cover behind rock outcroppings. They wear windproof pullover anoraks, usually white on one side and field gray or medium gray on the other. However, some were not reversible.

Ski troops move across an open area loaded with their battle rucksacks (Kampfrucksäcke). It was soon realized that the old style backpacks lacked sufficient capacity for the rations, spare clothing, and extra ammunition needed on the Eastern Front. Larger capacity rucksacks began to be issued in late 1941. These troops are armed with 7.9mm Gew.33/40 carbines (carbine-length even though designated rifles), formerly Czechoslovak vz.33 carbines. Rather than digging holes for telephone line poles, in frozen ground tripods were erected.

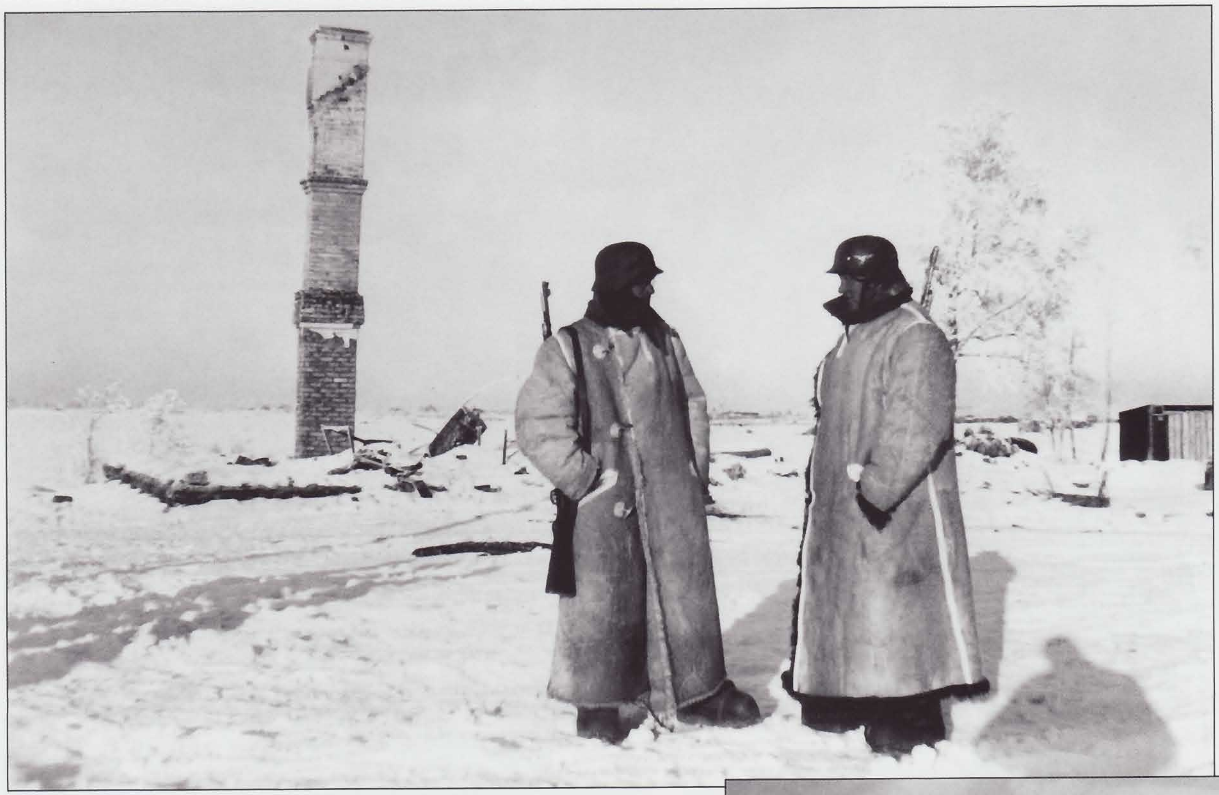






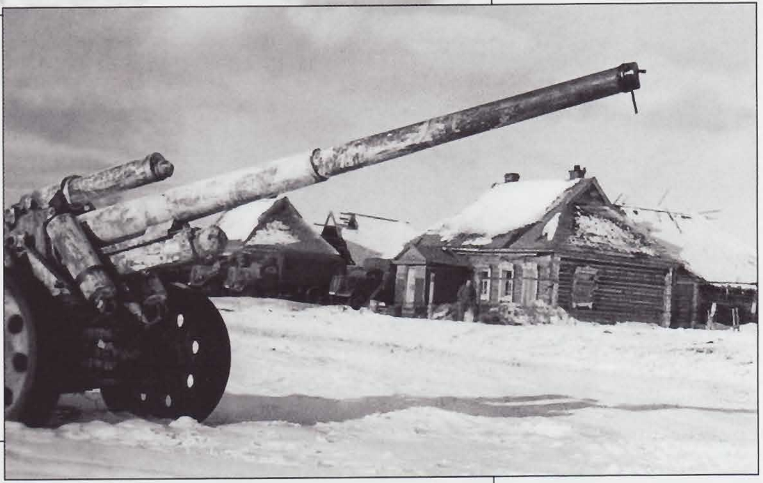
This 15cm s.FH18 is emplaced near houses (which also shelter the crew) and beside a tree where it would be difficult to pick out among the varied background and shadows. Sheet metal command flags are seen before the gun. The upper flag (from top to bottom, black, white red) is a divisional flag. Its black "Qu" represents Quartiermeister (Quartermaster). The lower flag is for an artillery survey unit.

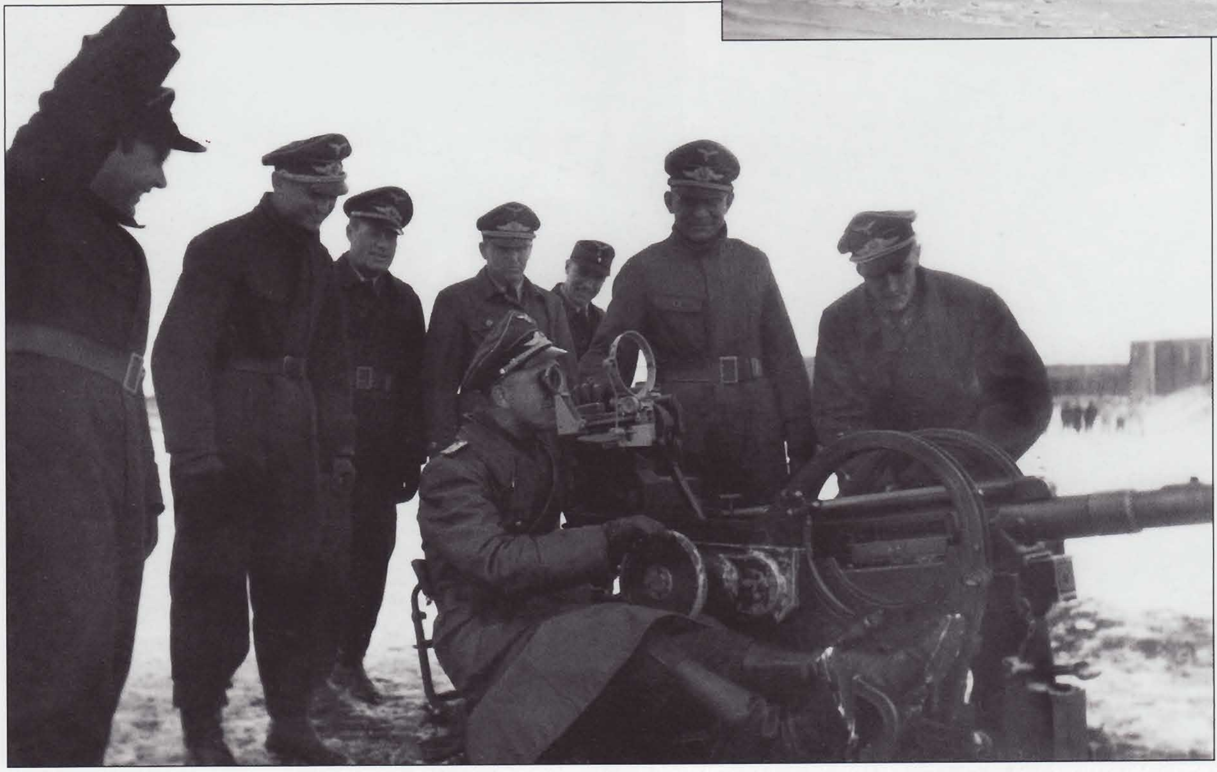
This 7.92mm MG34 machine gun on a Dreifuss 34 antiaircraft tripod is fed by a 300-round belt. The close-fitting insulated cap was issued with the reversible insulated winter unit and designed to be worn under the steel helmet.



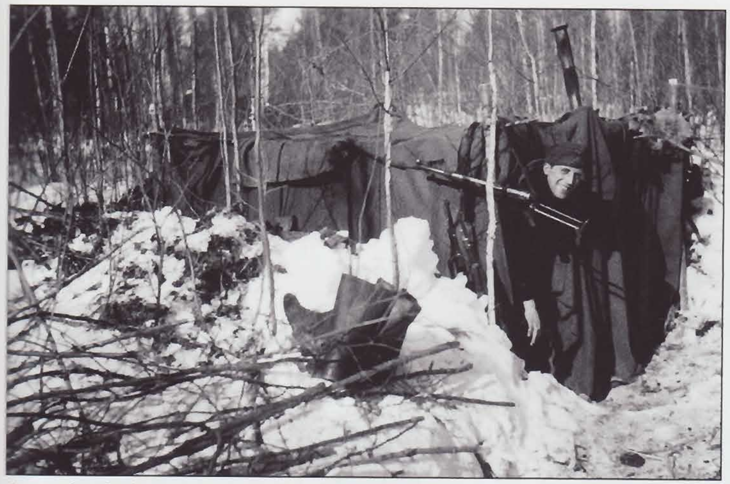
Two sentries wearing the Wachmantel. Note that the front openings are secured by wooden toggles. They also wear massive fur-lined leather over boots which are pulled over standard boots.

A 10cm K18 Kanone used for counterbattery fire. Its actual caliber was 10.5cm. At 19,075 meters it was the longest ranged piece possessed by the infantry division. Most divisions had one battery in the heavy artillery battalion. Those not provided a 10cm battery received an additional battery of 15cm howitzers.

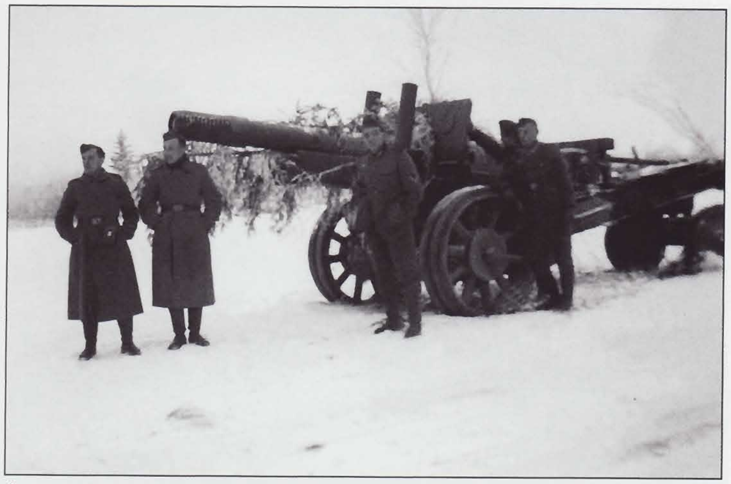




A Luftwaffe officer tries his hand at firing a 2cm Flak 30 antiaircraft gun. This weapon was replaced by the 2cm Flak 38 in 1939, but existing Flak 30s remained in use to the war's end.

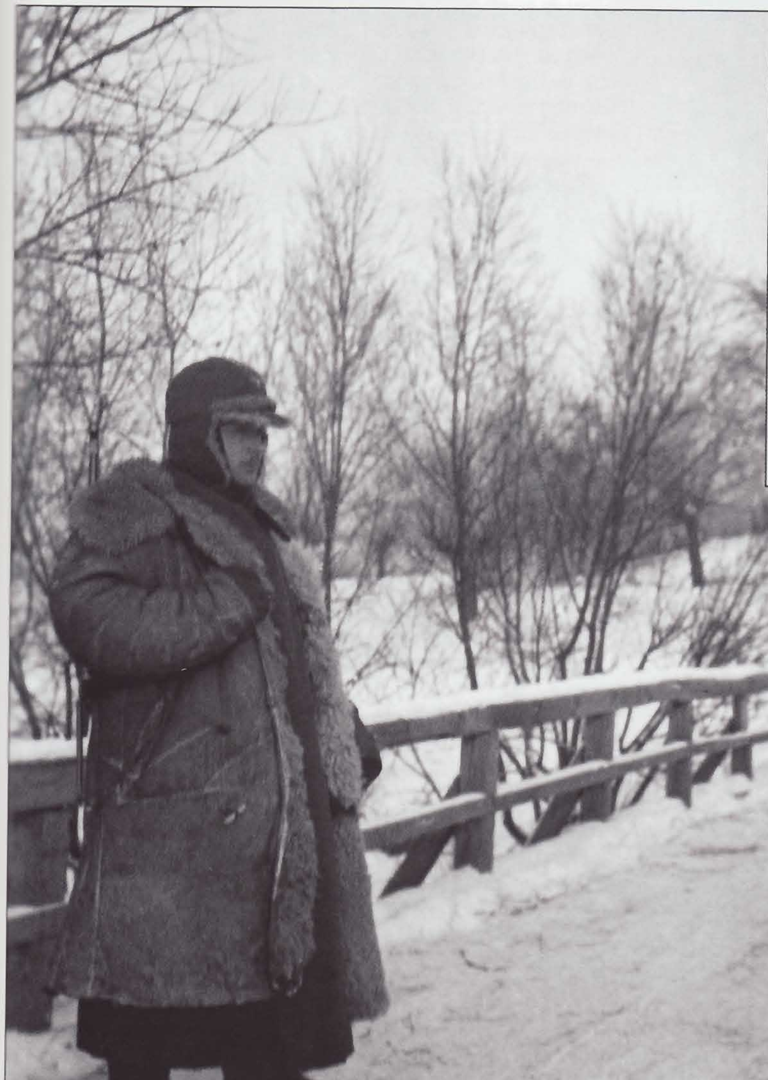


A crude shelter made of canvas tarpaulins in a snow-banked pit. The stovepipe appears to be made out of cartridge case with the head (base) cut out and crimped end-to-end. It is unusual that the weapons and boots were left outdoors.

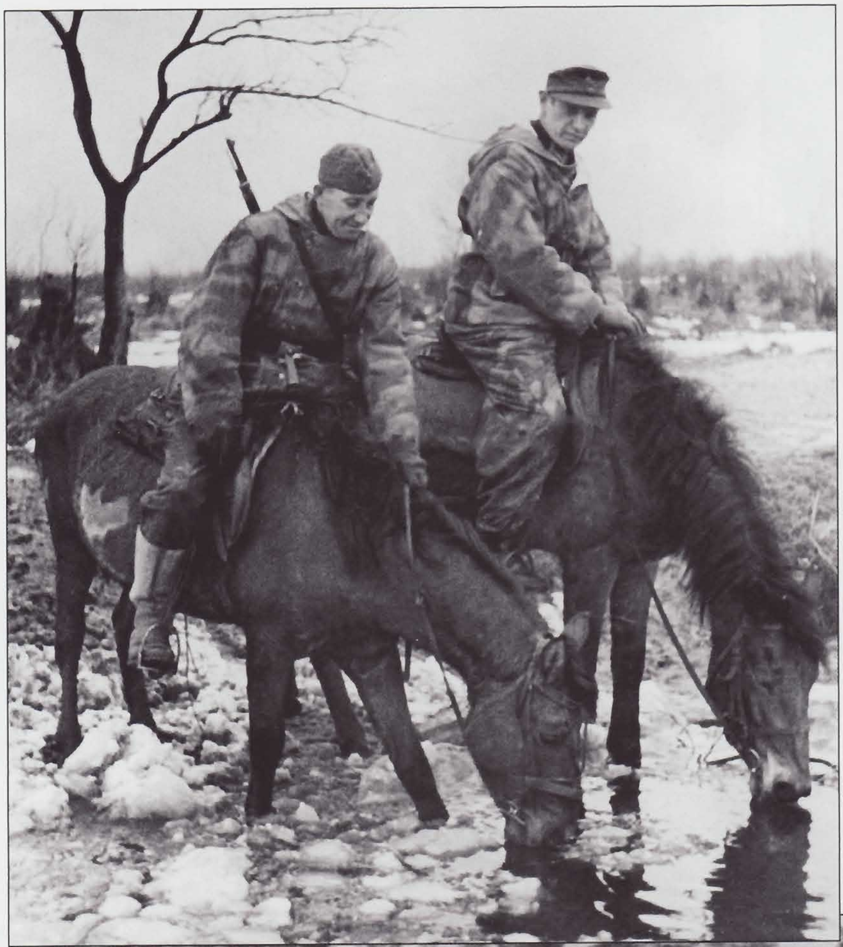


A great deal of Soviet armament was captured and put into German service, either augmenting or substituting for equivalent German equipment. Here a Soviet 152mm ML-20 (M1937) gun-howitzer serves in a divisional heavy artillery battalion. The Germans called it a 15.2cm K.H. 433/1(r) cannon-howitzer. It was almost 1,000 kilograms heavier than the German 15cm s.FH18, but it offered almost 5,000 meters more range. Soviet artillery usually outranged their German counterparts. The Germans also used the 152mm in the coastal defense role being deployed as such in France. Horse- or tractor-drawn pieces were fitted with spoked wheels, but truck-towed weapons had pneumatic tires.

Clowning around, German soldiers supervising a snow clearing detail of Russians offer a shovel to a female worker. As bundled up as the men are, she's still wearing only a woolen skirt.

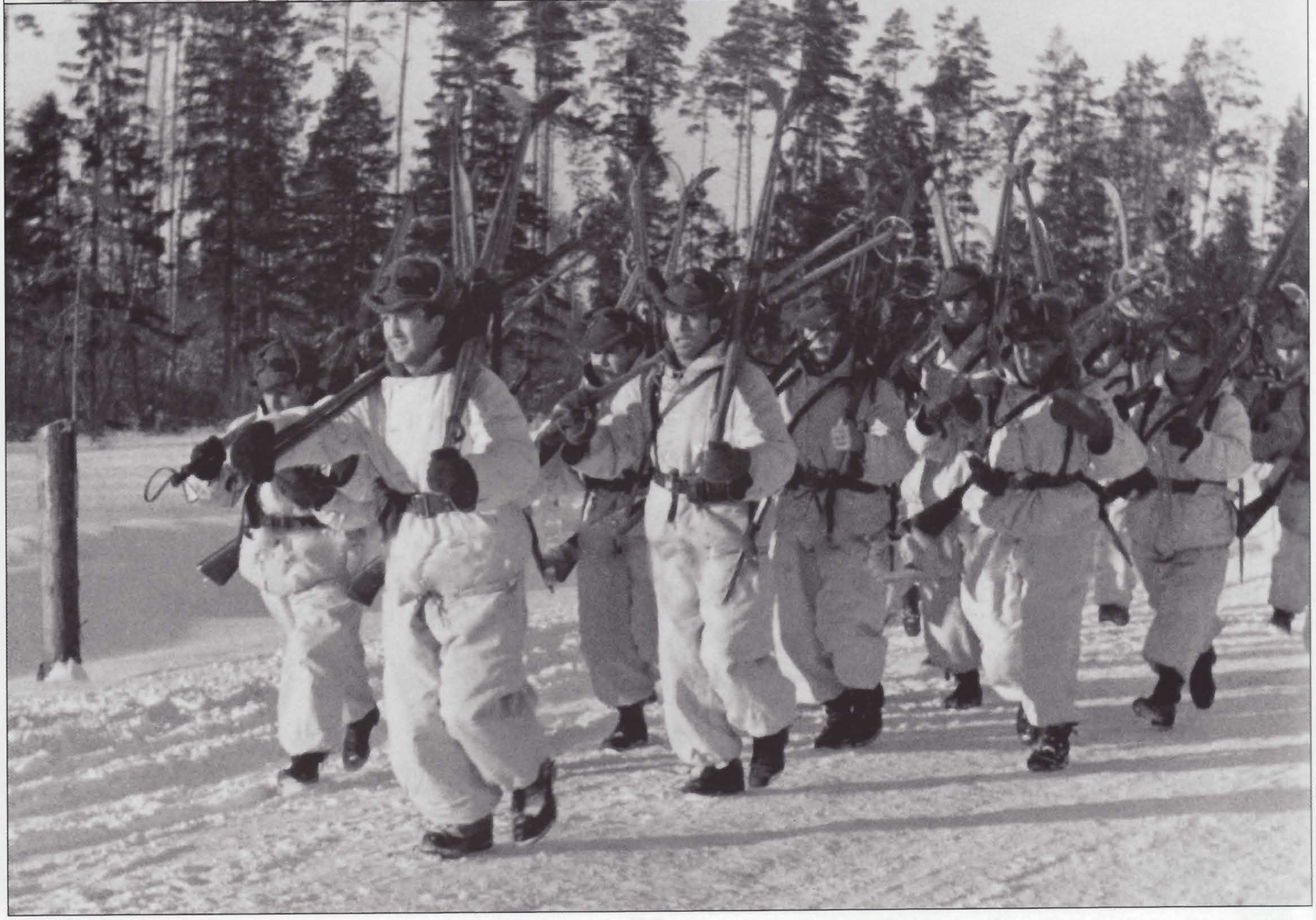


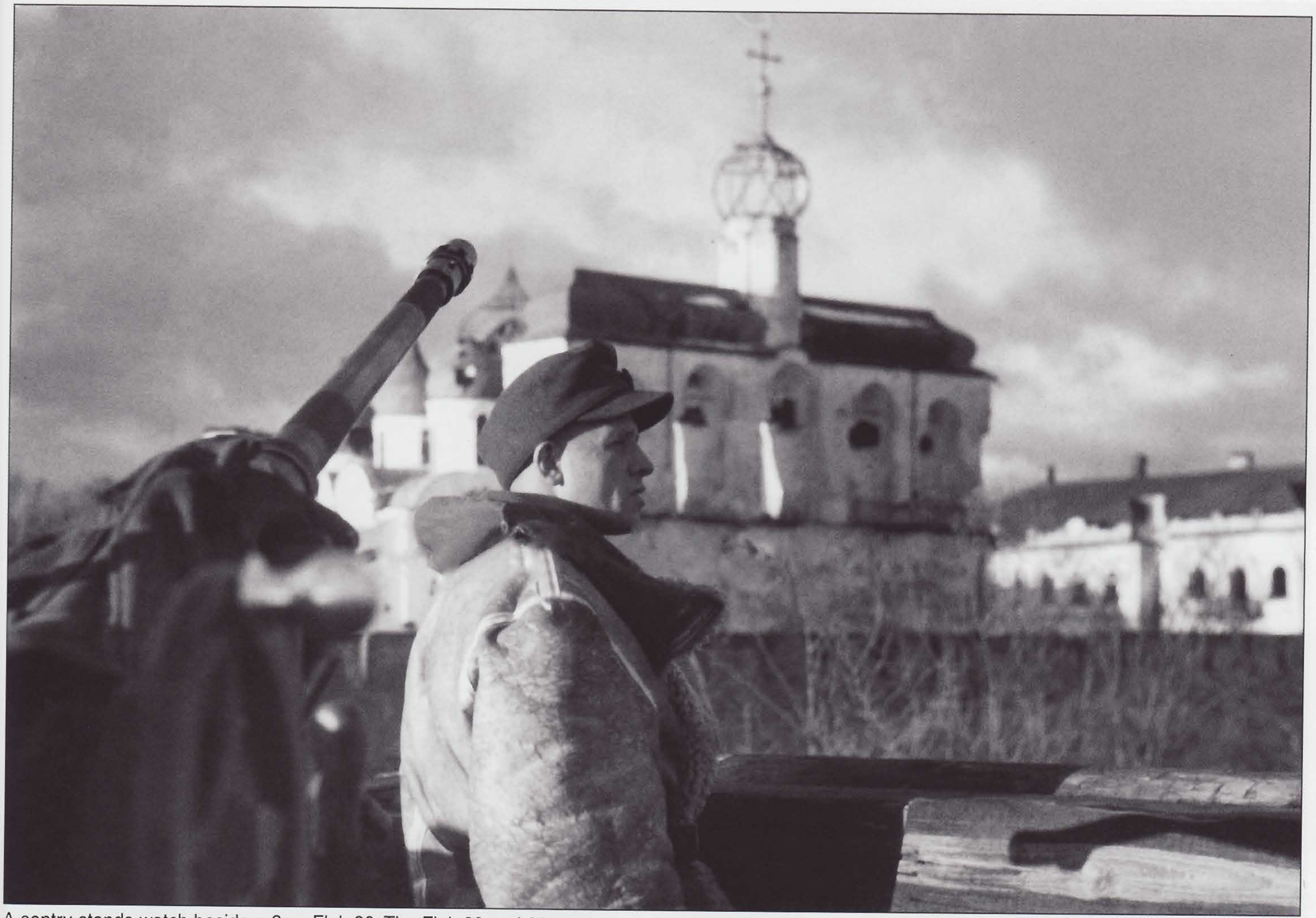
A well insulated sentry guards a road bridge. He lacks the usually heavy fur-lined leather or woven straw overboots, probably because he was expected to walk the bridge's length frequently. Partisan attacks on lines of communication were a continuous threat. Soldiers so encumbered by protective clothing would move slowly and lack agility. They were taught to discard outer coats immediately if an attack was mounted.



Spring is arriving with the thaw. The two riders have reversed their insulated winter suits to the camouflage pattern side. The near rider will soon have to discard his felt boots as they will fall apart when wet.

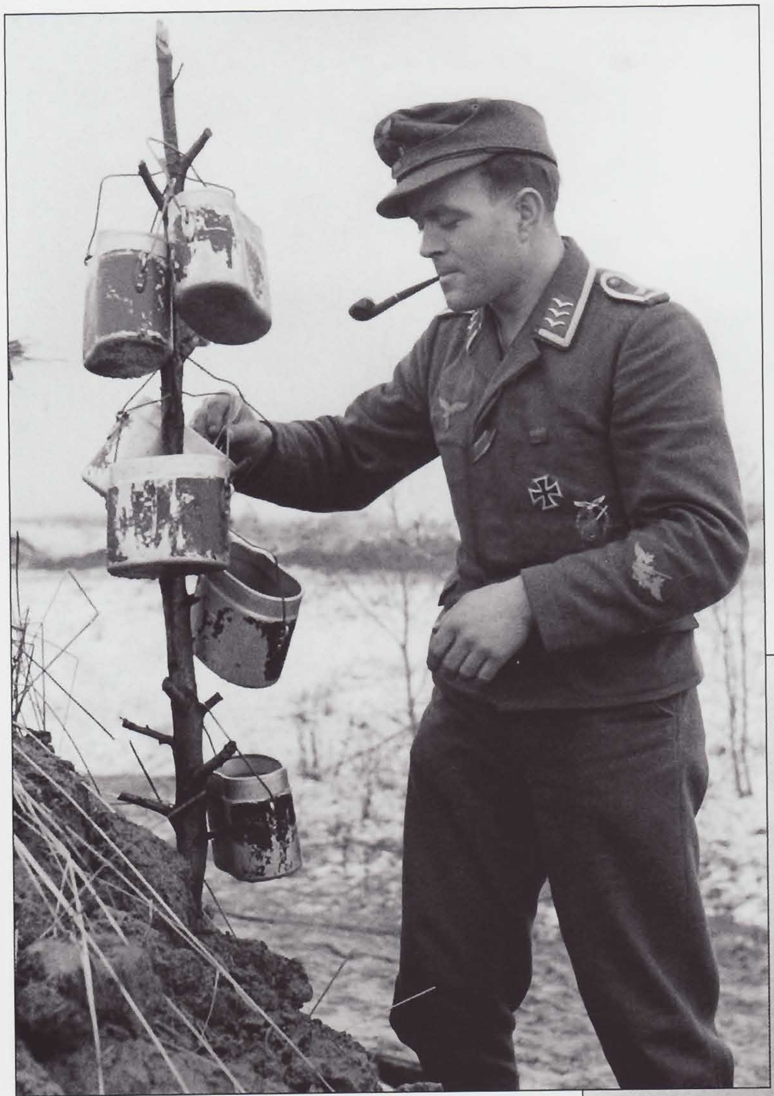
Ski troops jog down a road. While snow-covered roads can be skied on, this closes up the formation rather than it being strung out owing to the space needed between each man when wearing skis. Ski troops would periodically carry their skis and walk on suitable terrain to work different leg and arm muscles.



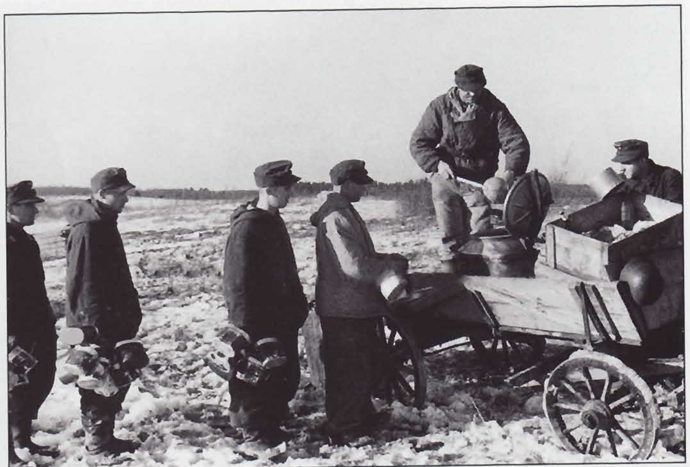


A sentry stands watch beside a 2cm Flak 30. The Flak 30 and 38 were very similar and difficult to tell apart if the shields were removed. An easy way to tell the difference is by the barrels. The Flak 30 had a straight flash suppressor with thin slots and a bulbous (rounded) portion near its base. It also had two approximately five-inch (130mm) wide knuckled bands around the barrel, grips for changing the barrel, one near the lower end of the barrel and the other just behind the flash suppressor (appearing as dark bands in the photograph). The Flak 38 had a cone-shaped flash suppressor, while one knuckled band was near the lower end and the other just below the middle of the barrel.

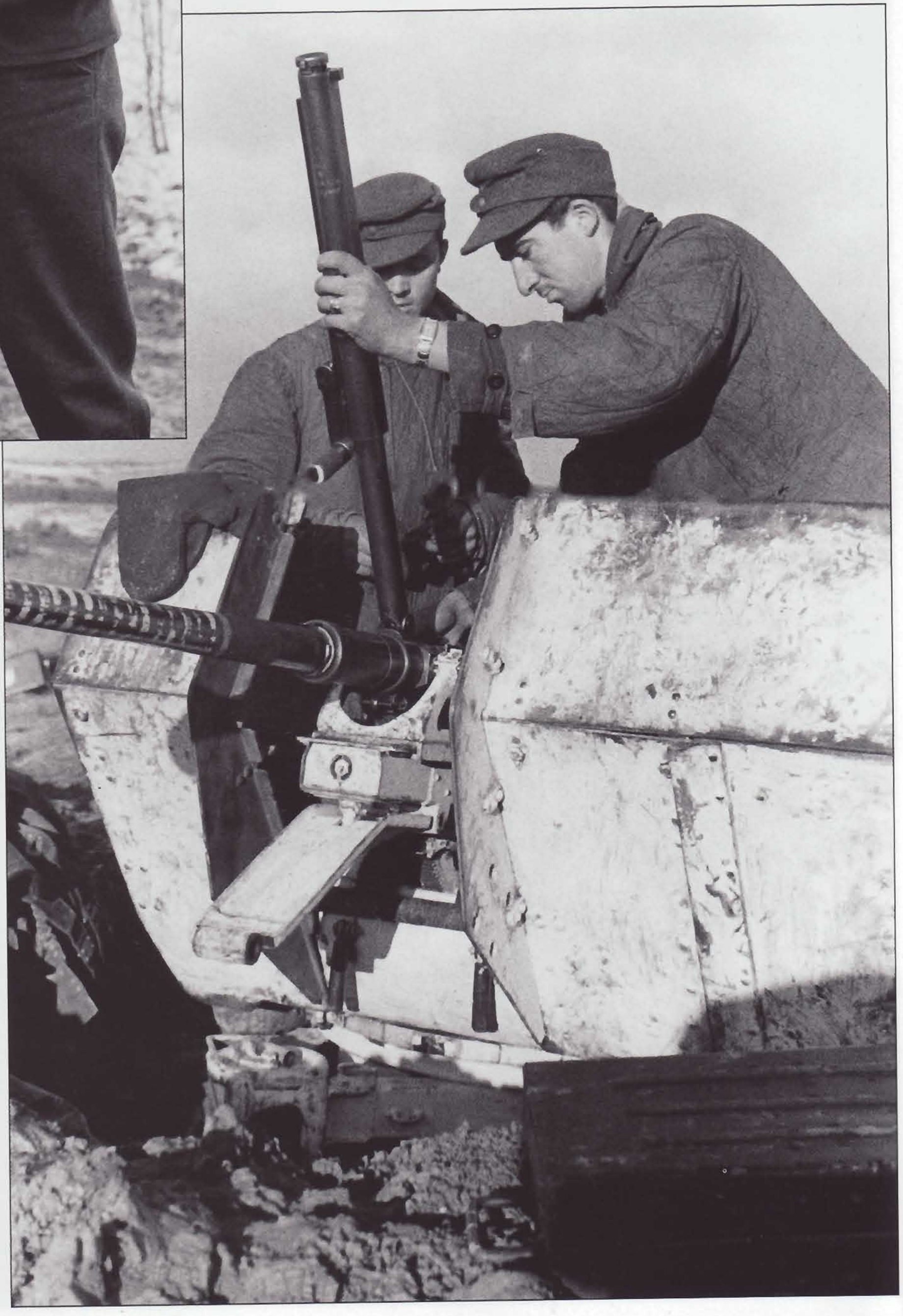
The crew of a 15cm s.FH18 howitzer pumps out rounds. The projectiles were shipped in the wooden frames containers and the cartridge cases in the boxes.



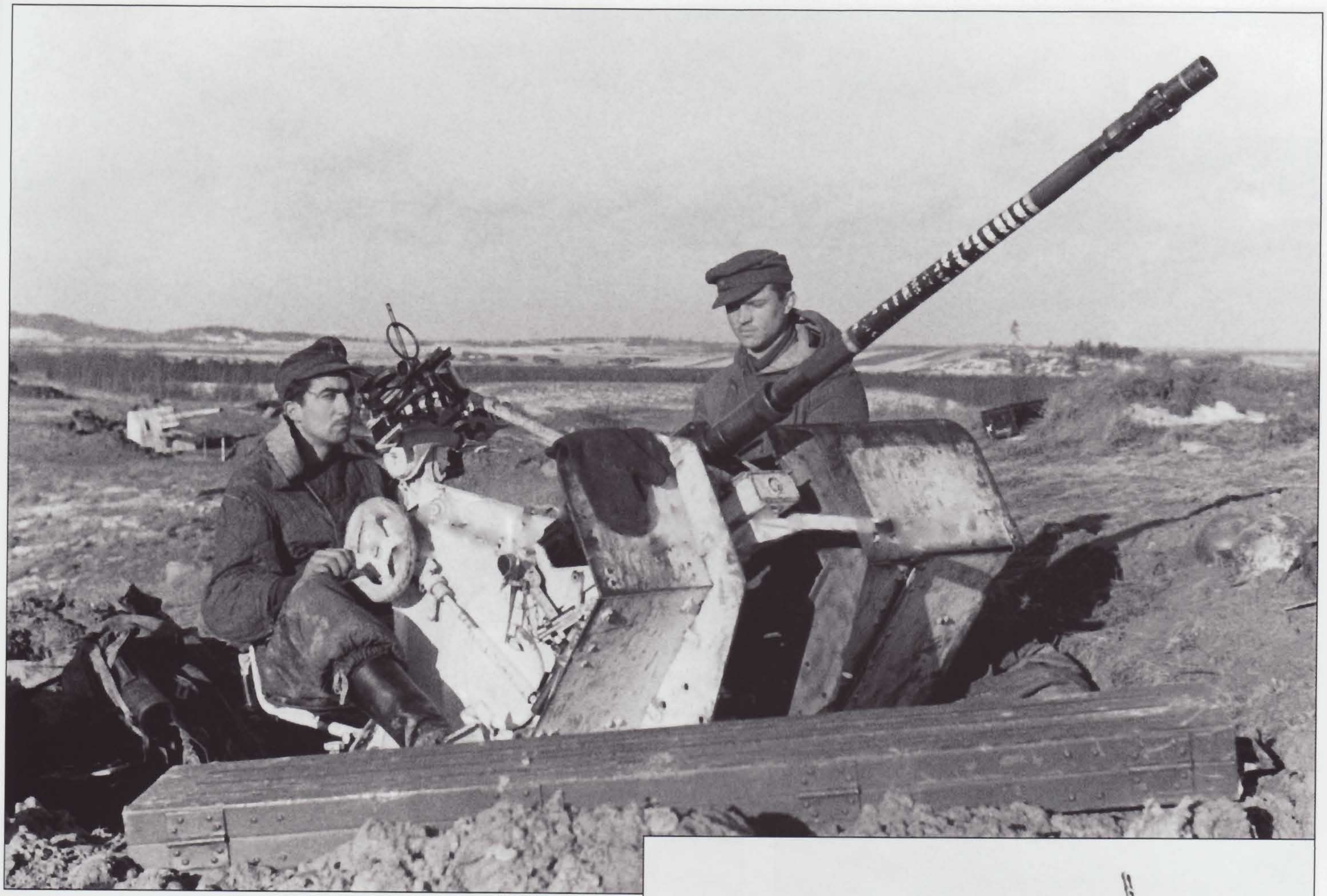
This Luftwaffe Feldwebel collects his cook pot after it was delivered to his Flak emplacement. He displays the ribbon of the Iron Cross 2nd Class on his tunic front opening and the Iron Cross 1st Class on his breast pocket along with the Flak Combat Badge of the Luftwaffe. On his cuff is the elaborate Rangefinder Badge.



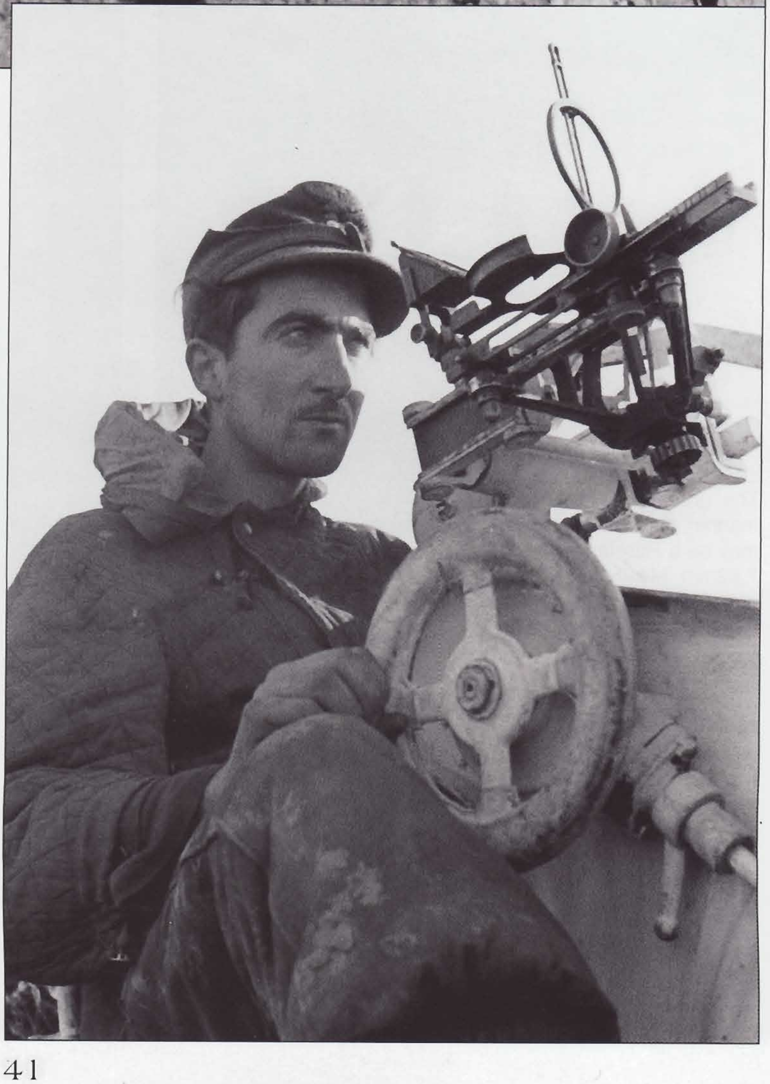
A cook aboard a Russian farm wagon serves soup, probably already cold, from an insulated container. The boys picking up the soup bring the cook pots (mess kits) from each bunker. They are on the unit's rolls as auxiliary volunteers (Hilfswillige—Hiwi). Basically they worked for food. The cook pots will be returned and reheated on bunker stoves.



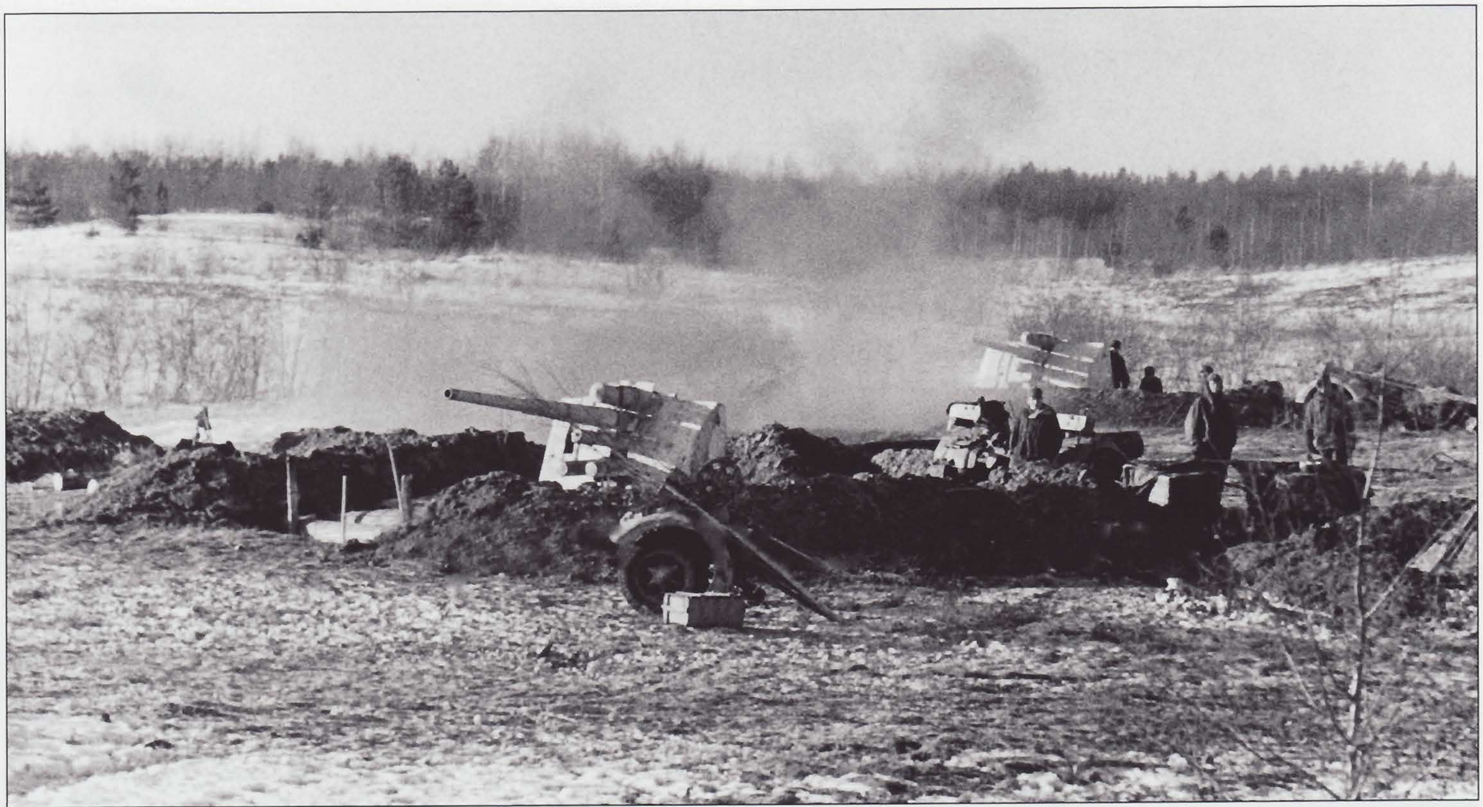
The crew of a 2cm Flak 30 remove the recoil cylinder for cleaning and adjustment. The gun shield and cradle have been whitewashed, but the gun itself was never painted.



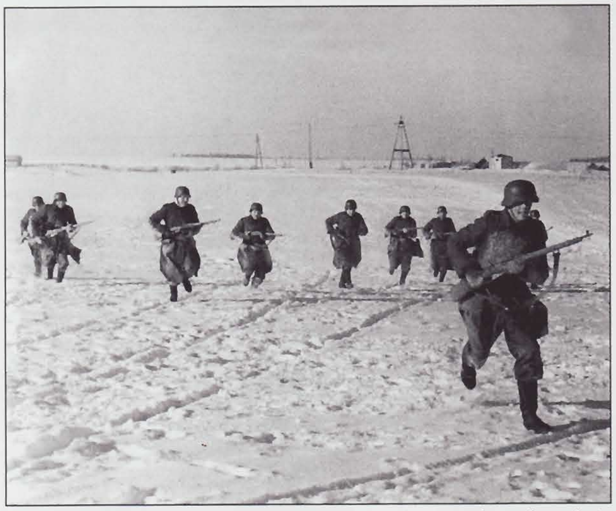
The same gun crewmen run through a test after cleaning the gun to ensure it operates perfectly. The long case to the front contains two spare barrels. Note the 18 kill rings (Abschussringe), partly worn off on the lower knuckled handgrip band. Over the gunner's shoulder can be seen one of the 8.8cm guns that the light Flak is protecting.



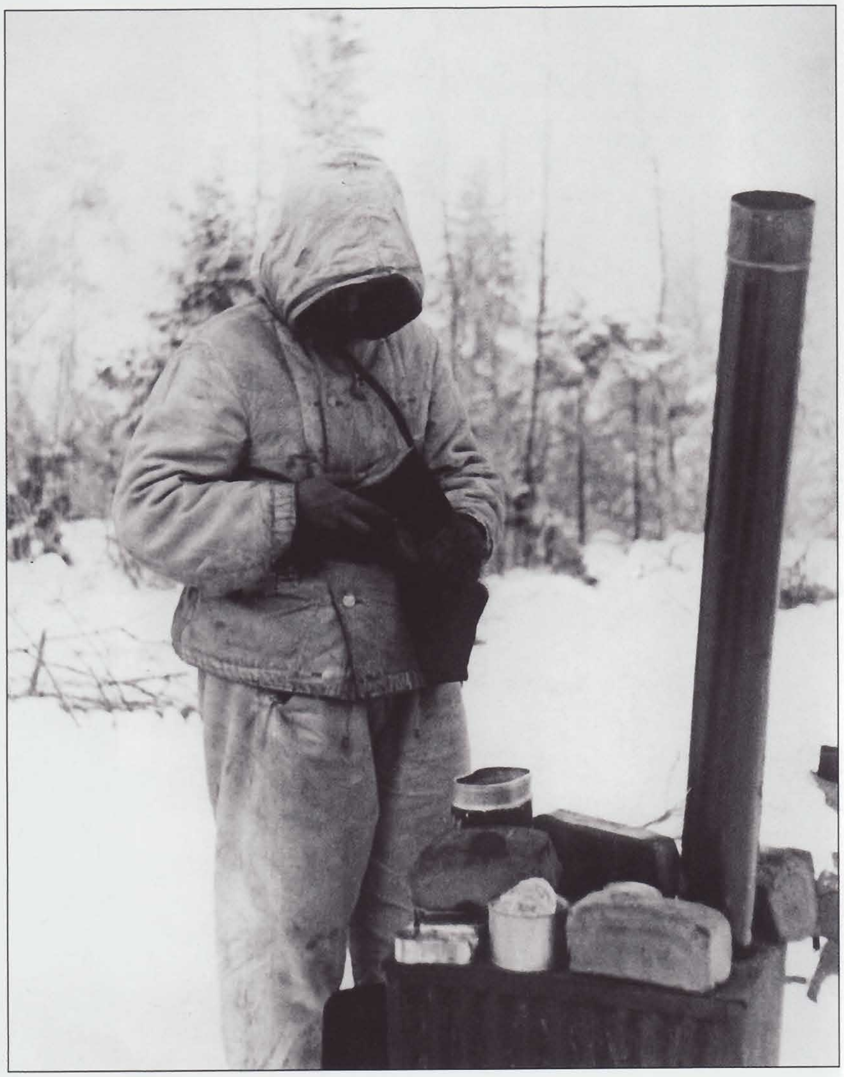
A detailed study of the Flakvisier 35 gun sight used on the Flak 30.



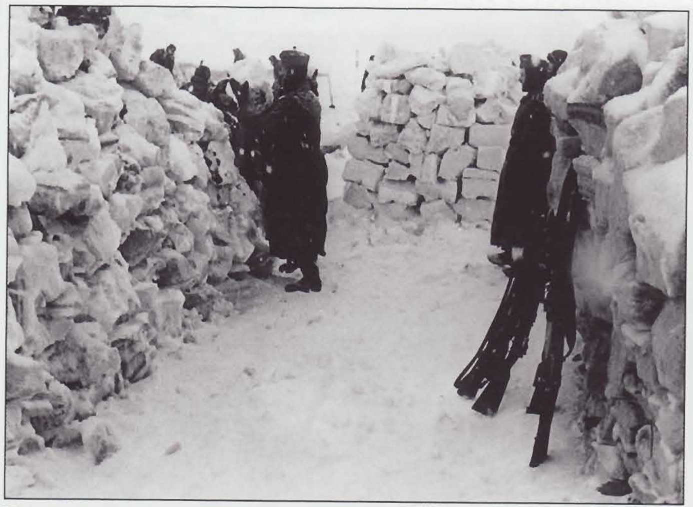
A pair of 8.8cm Flak antiaircraft guns shown conducting indirect fire against ground targets, something for which the guns, with their flat trajectory, were seldom used, nor very well suited. Usually the gun positions were more widely separated. This scene demonstrates how conspicuous whitewashed equipment was in the spring, especially against the dark spoil of dug-in emplacements. It would require some hard scrubbing to remove the chalk or lime-based paint.



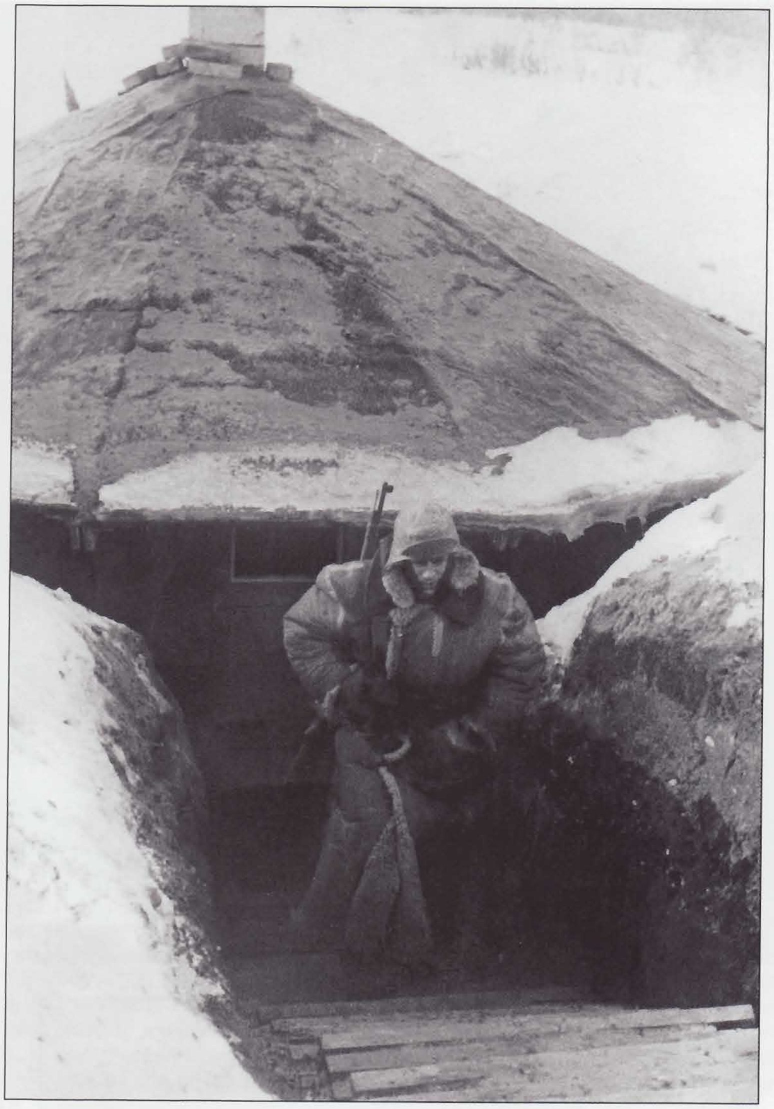
The group (squad) is practicing tactics in a rather disorderly manner, as one man is much too far ahead of his comrades. This may be a Russian-manned security unit as they are armed with 7.62mm Mosin-Nagant M1891/30 rifles, which the Germans called the Gew.252(r).



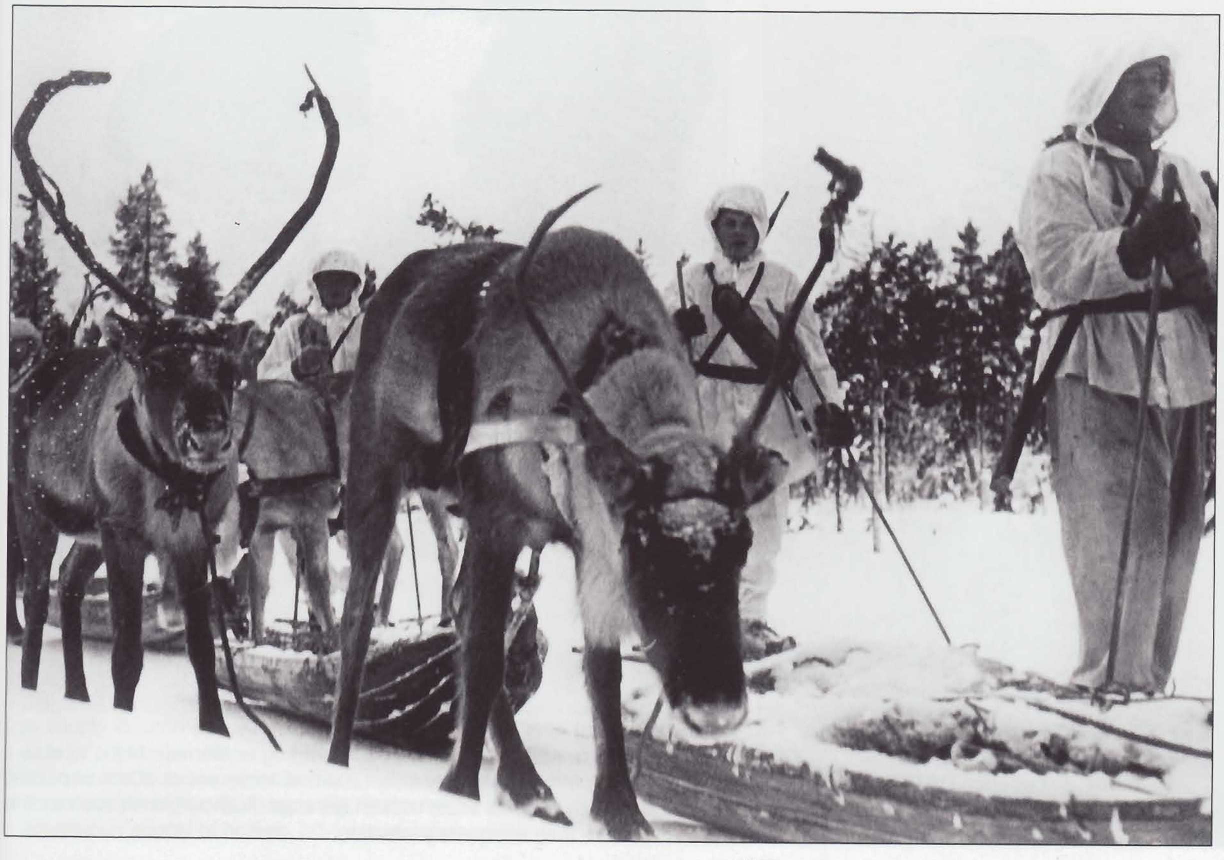
A Landser heats his rations on a field stove. Loaves of bread, issued by the divisional bakery company, are set on the stove for thawing out. Usually these were kept in bunkers, but this one has been set up in the open to allow troops easy access.



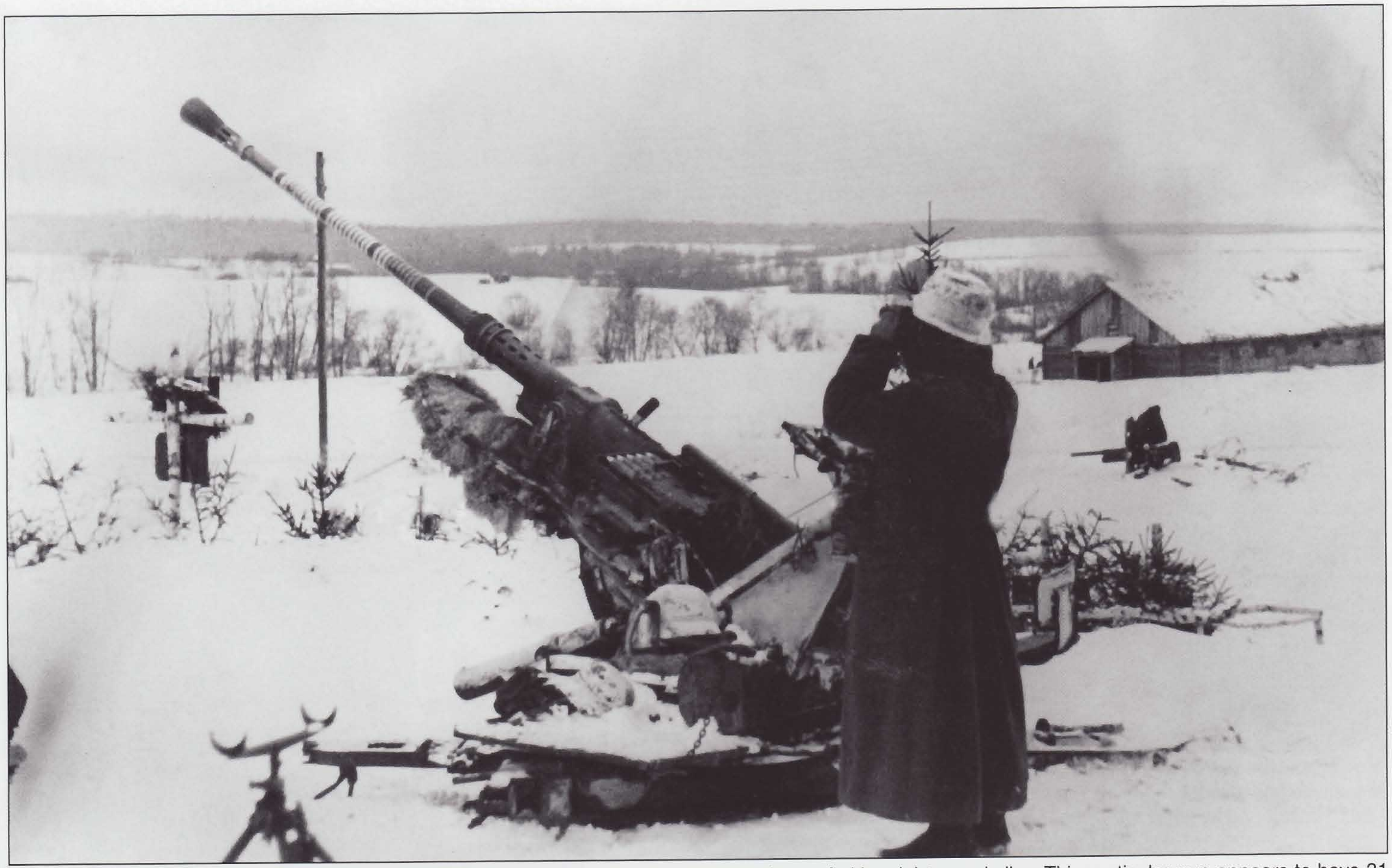
This frosty trench system is revetted with rocks. Coupled with many feet of frozen snow this provides a great deal of protection. In the spring thaw the snow will melt and portions of the stone facing will collapse. The position will have to be constantly reconstructed by repositioning rocks and adding sandbags and logs. The position might even be moved in the process because with the snow gone the lie of the land changes and positions can be shifted to more favorable terrain.



This structure appears to have a felt (tarpaper) roof stretched over some other insulating roof material. While the roof does not appear to be shell-proof it was built below ground level. The access trench even has wooden steps.

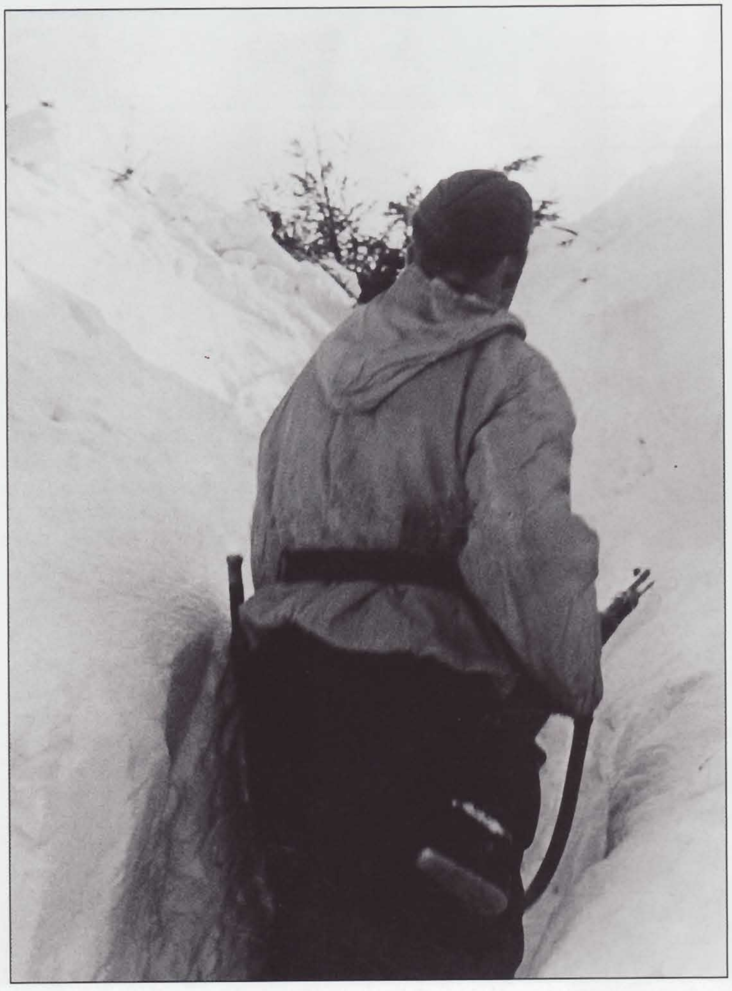


As mentioned before, any means of transport was utilized. Here, reindeer are used to tow pulks in Finland. Reindeer proved to have more stamina than horses and their adapted hooves provided better traction in snow. However, they proved to be more belligerent than mules.

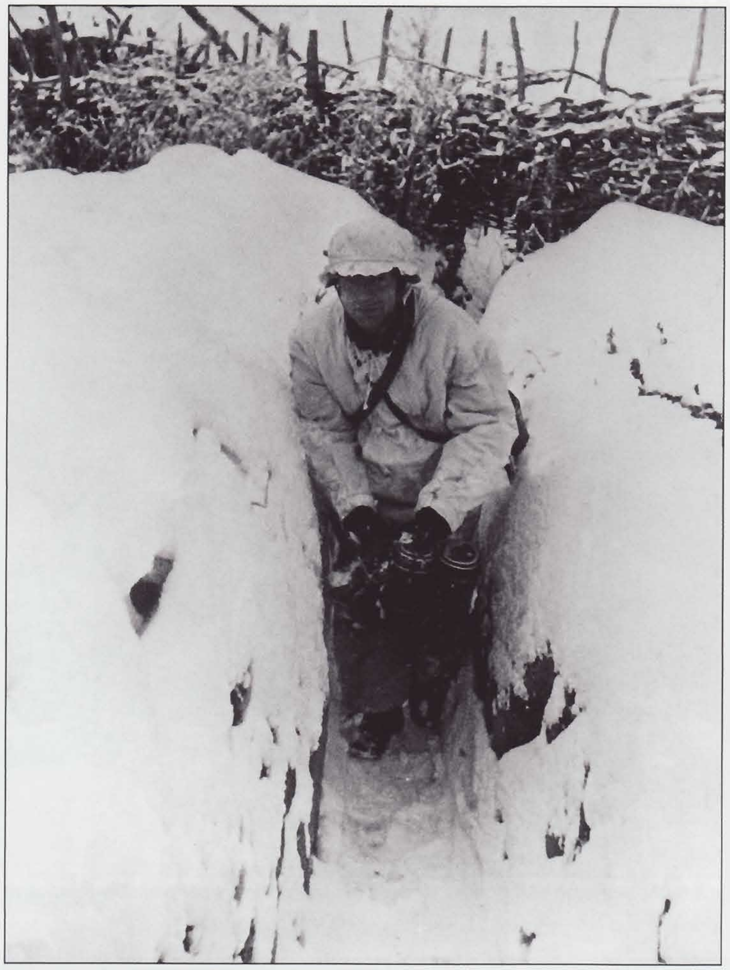


An air guard scans the sky for Soviet aircraft beside a 3.7cm Flak 36 antiaircraft gun. It was fed by eight-round clips. This particular gun appears to have 31 kill rings. The recoil cylinders under the barrel are protected by sacking, possibly packed with insulating straw.

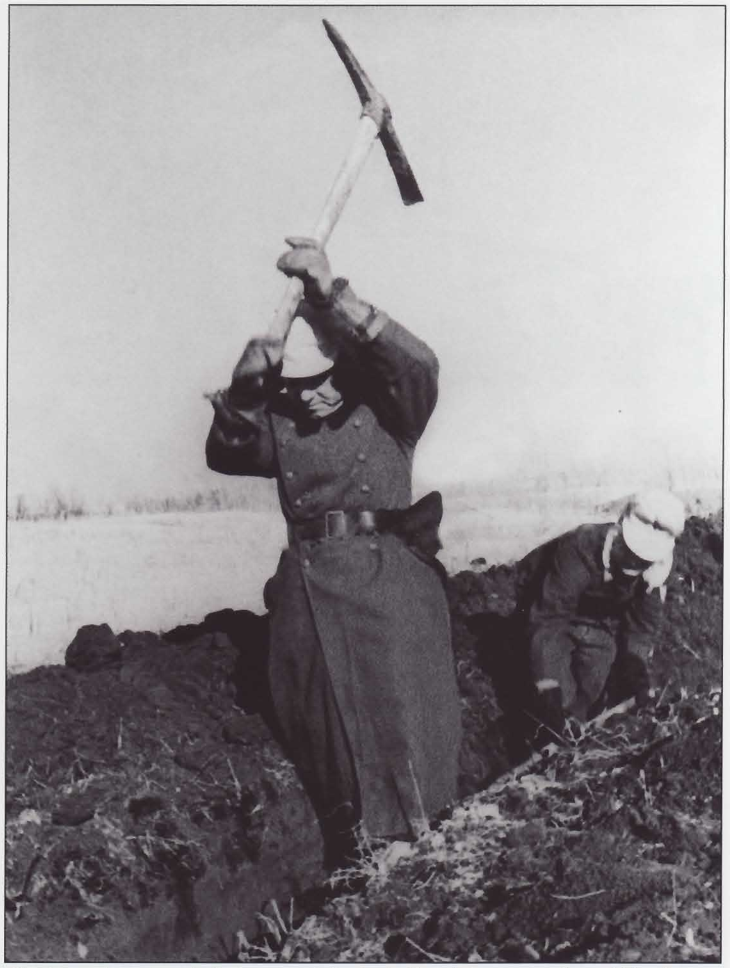
Artillerymen manhandle 15cm rounds packed in wicker containers, each weighing 43.5 kilograms. Soldiers called such rounds and baskets "Koffer" (suitcases).



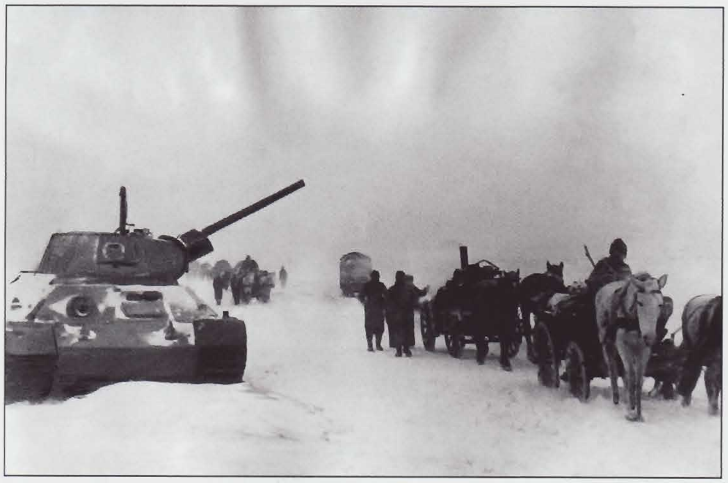
A rifleman slips down a snow trench. According to German tests, to stop a rifle or machine gun bullet required 120cm of loose snow, 80cm of packed snow, and 40 to 60cm of snow with an ice crust. A snow trench such as this provided more than adequate protection.



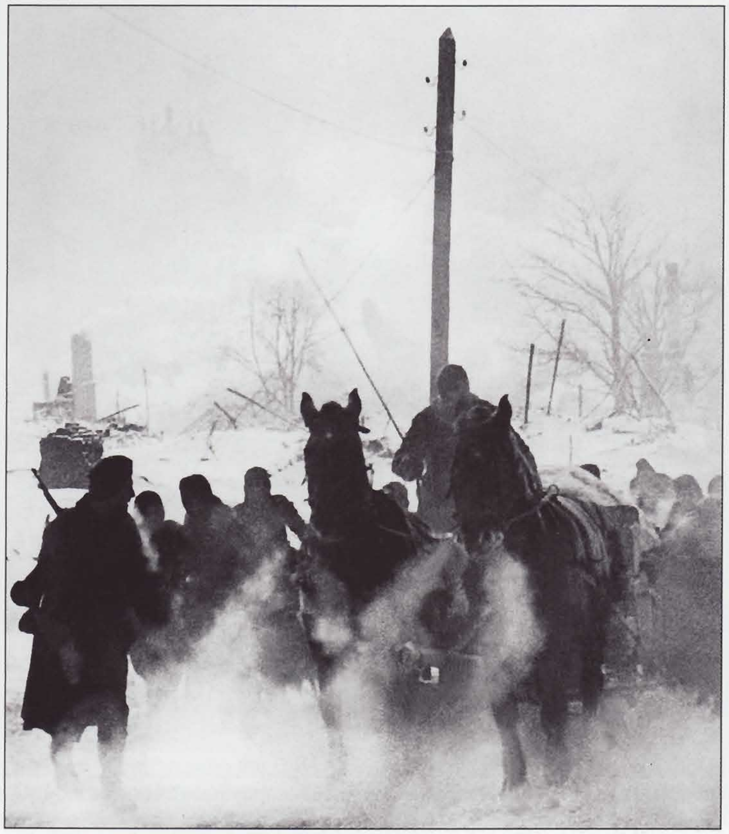
A Landser carries his bunker comrades' cookpots back from the field kitchen. Note the brushwood fence in the background erected to screen trench activity from the enemy. Meals were often soups and stews such as Kohlsuppe (cabbage soup), Erbsensuppe (pea soup), Frontkameradensuppe (front comrades' soup) of ham, beans and potatoes; and the infamous Wassersuppe (water soup) so lacking in ingredients that it was not much more than hot water with vegetable bits.

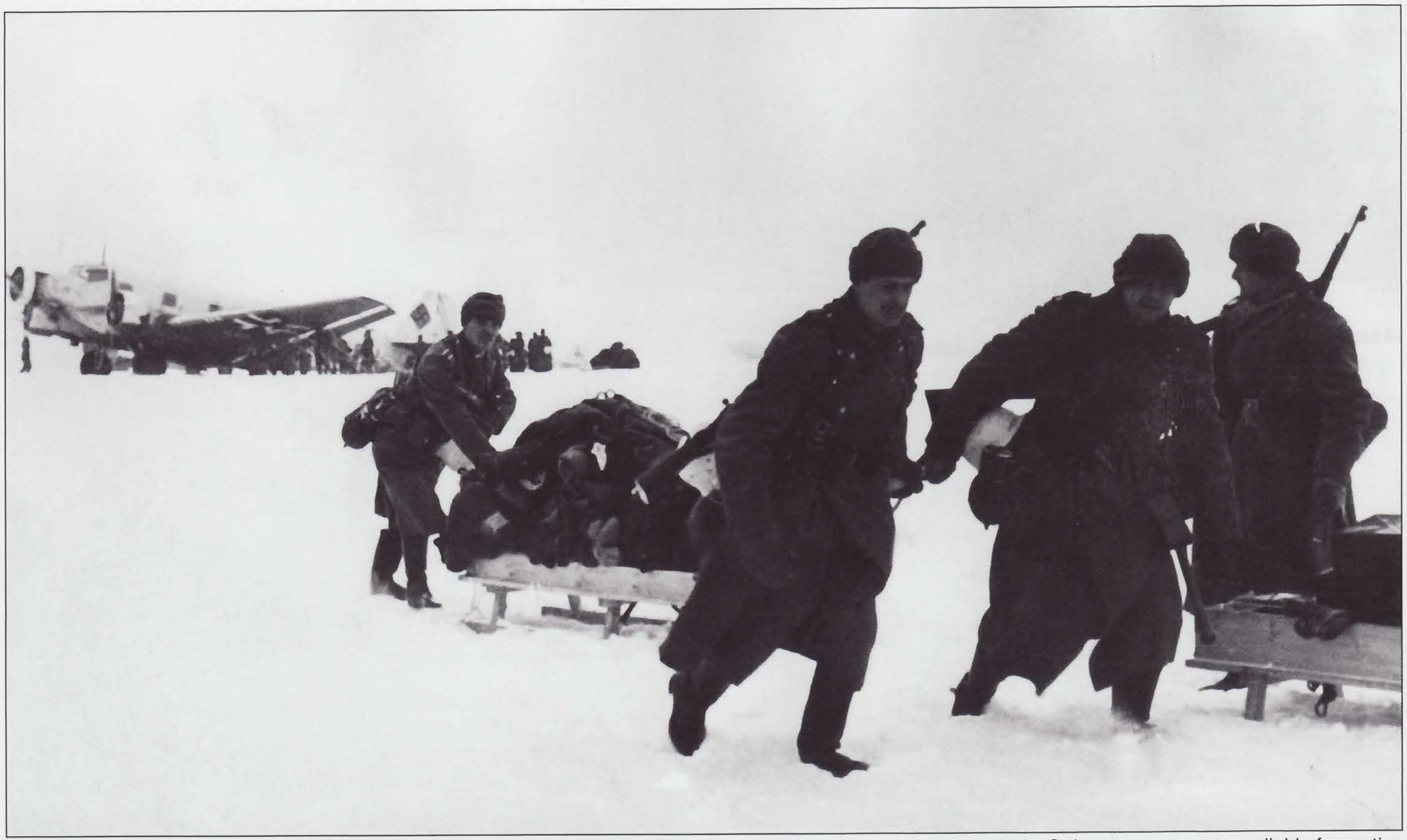


Digging a trench entailed a great deal of effort. The ground could be frozen solid from two to six feet (0.75 to 2 meters) depending on the duration of the freezing temperatures, amount of moisture in the spoil, thickness of snow and grass, and wind chill. Slit trenches were dug as narrow as possible, as little as 2 feet (60cm) for protection from aircraft strafing and artillery air bursts.

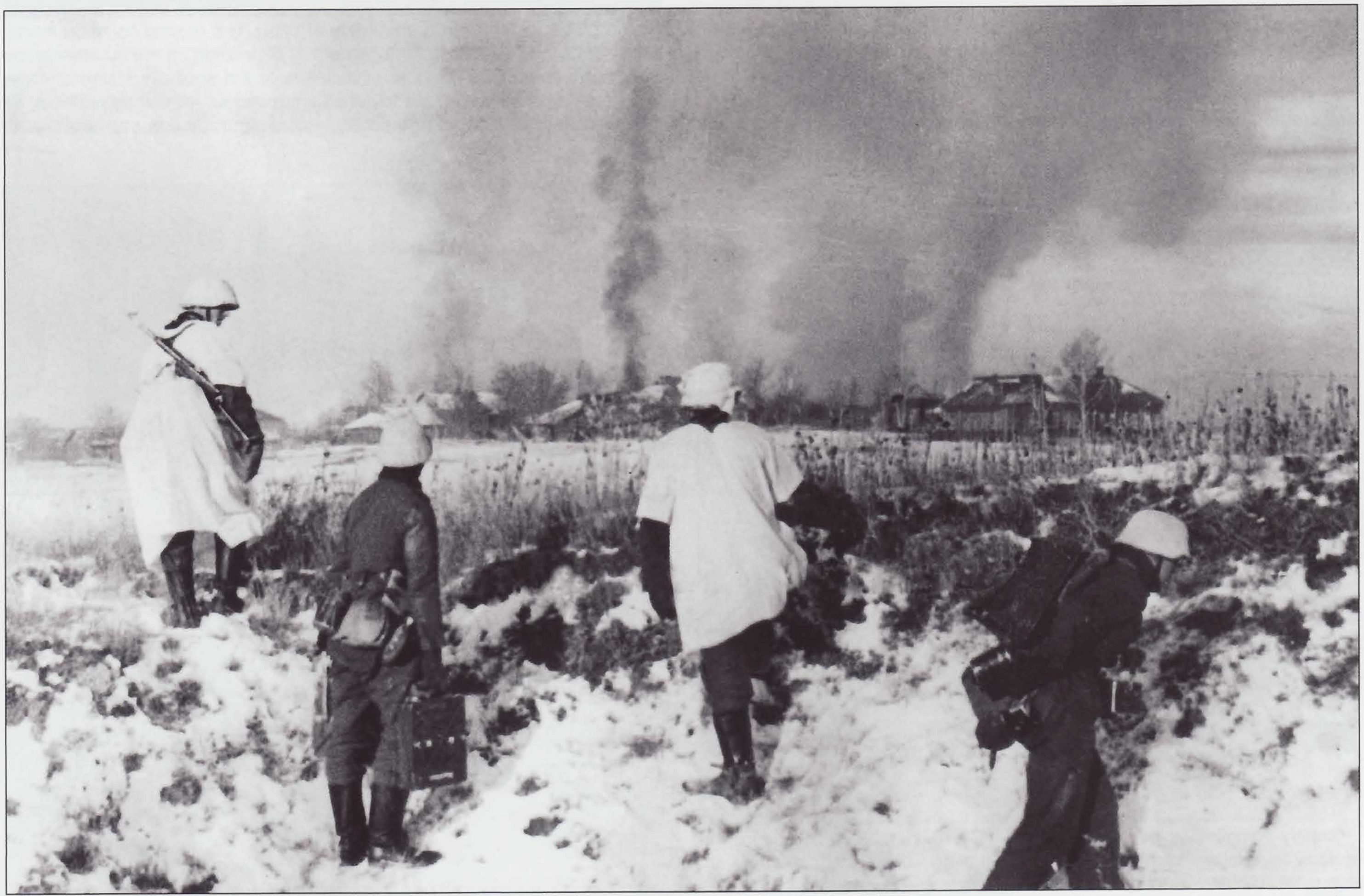


A supply column passes a knocked out T-34/76. Horses could endure the vicious cold better than men, but the unrelenting work loads, day and night exposure to sub-zero conditions, and inadequate diet ensured few horses survived the winter. Consequently, the remount service had to maintain a continuous supply of horses.





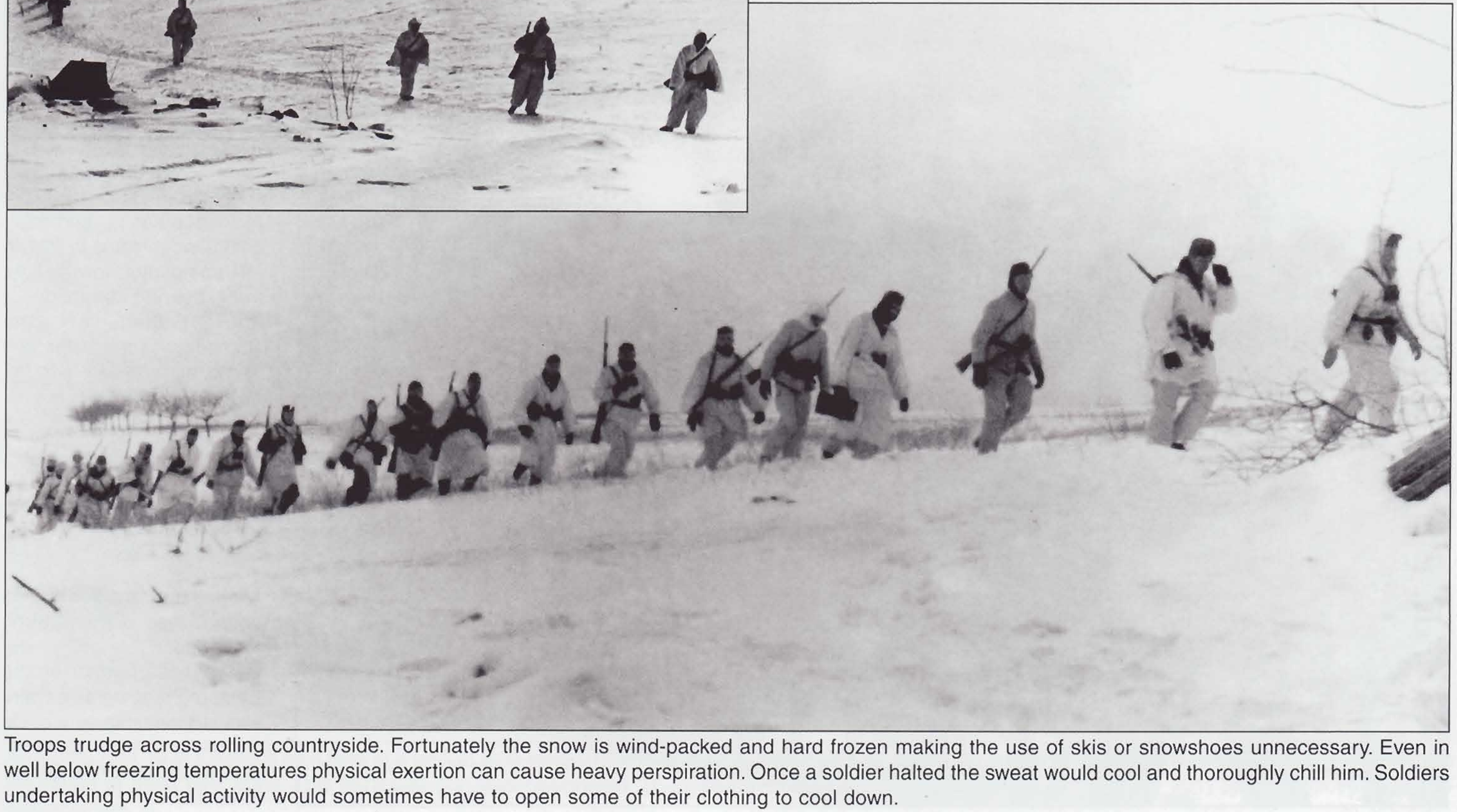
Troops haul air-delivered supplies, some of which appear to be winter clothing, back to their unit on homemade sleds. Only manpower was available for motive power. The Ju 52 kept many units supplied through the winter months.



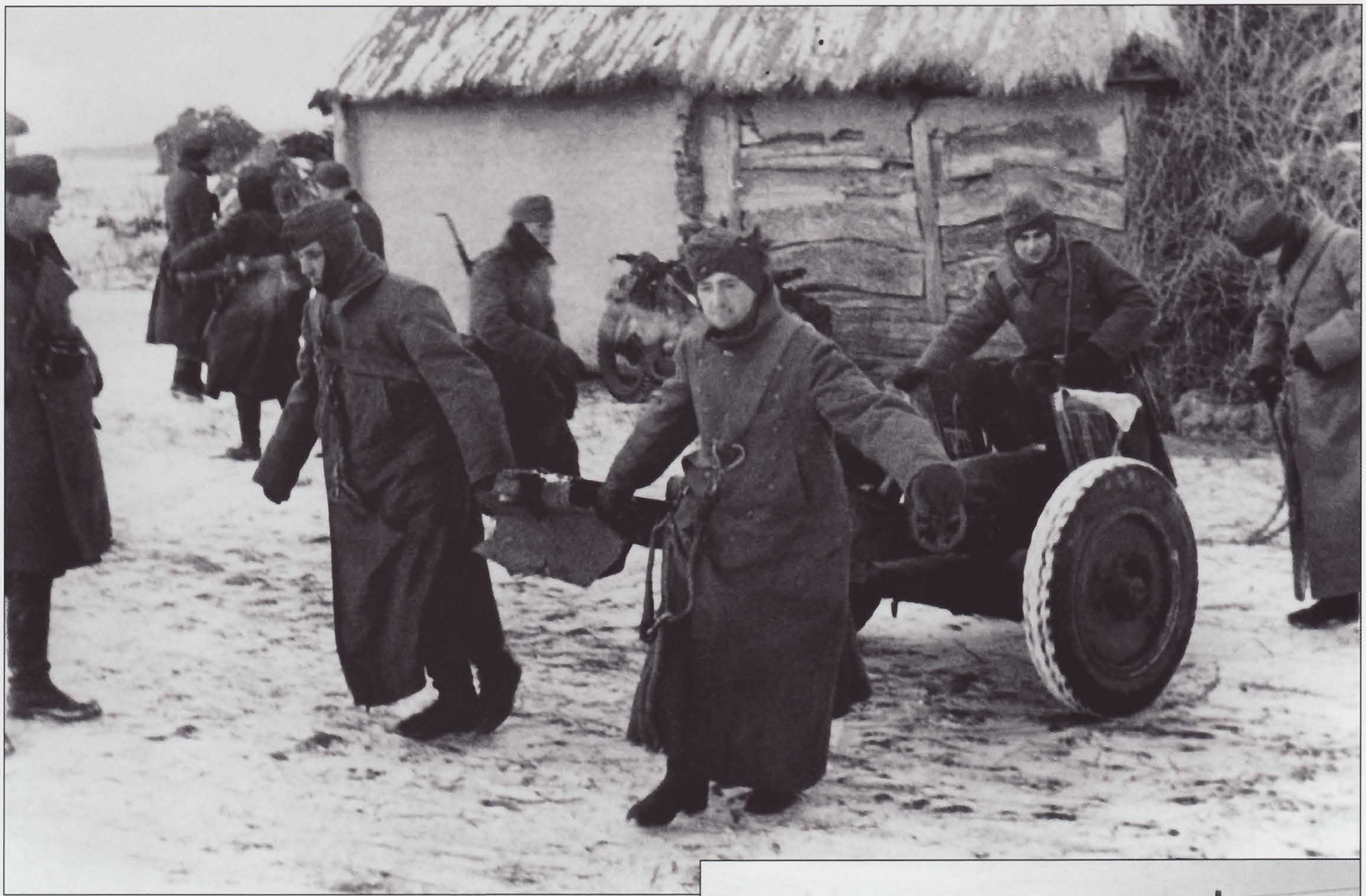
Troops approach a smoldering village. The fires may have been started by German preparatory artillery fire, but were just as liked intentionally lit by retreating Soviet troops to deny Germans shelter.

Comrades share a bottle of vodka. Alcoholic beverages give the illusion of warmth when swallowed, but actually they thin the blood and contribute to dehydration, both of which increase the loss of body heat and result in hypothermia. At the time hypothermia (loss of core body heat, its causes, and how to treat it) was not fully understood.

A rifle company, wearing their Zeltbahn tent quarters, follows a telegraph line to the front. The Zeltbahn was designed to allow it to be worn as a cape.

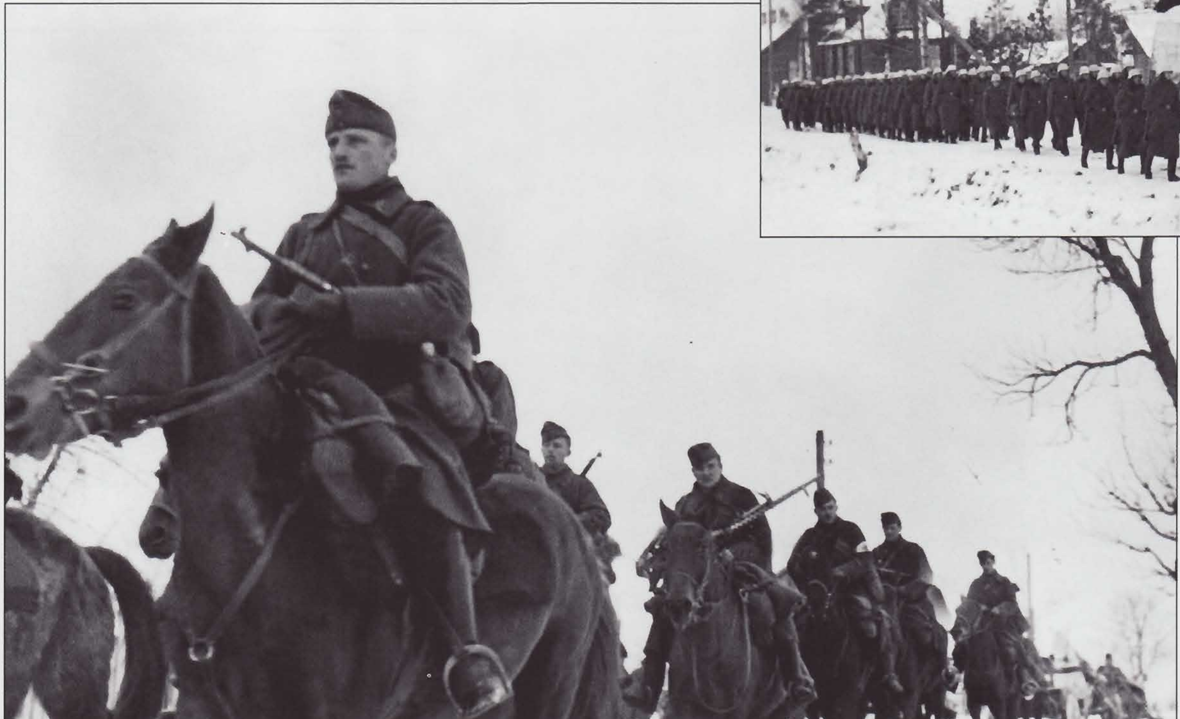


Troops trudge across rolling countryside. Fortunately the snow is wind-packed and hard frozen making the use of skis or snowshoes unnecessary. Even in well below freezing temperatures physical exertion can cause heavy perspiration. Once a soldier halted the sweat would cool and thoroughly chill him. Soldiers undertaking physical activity would sometimes have to open some of their clothing to cool down.

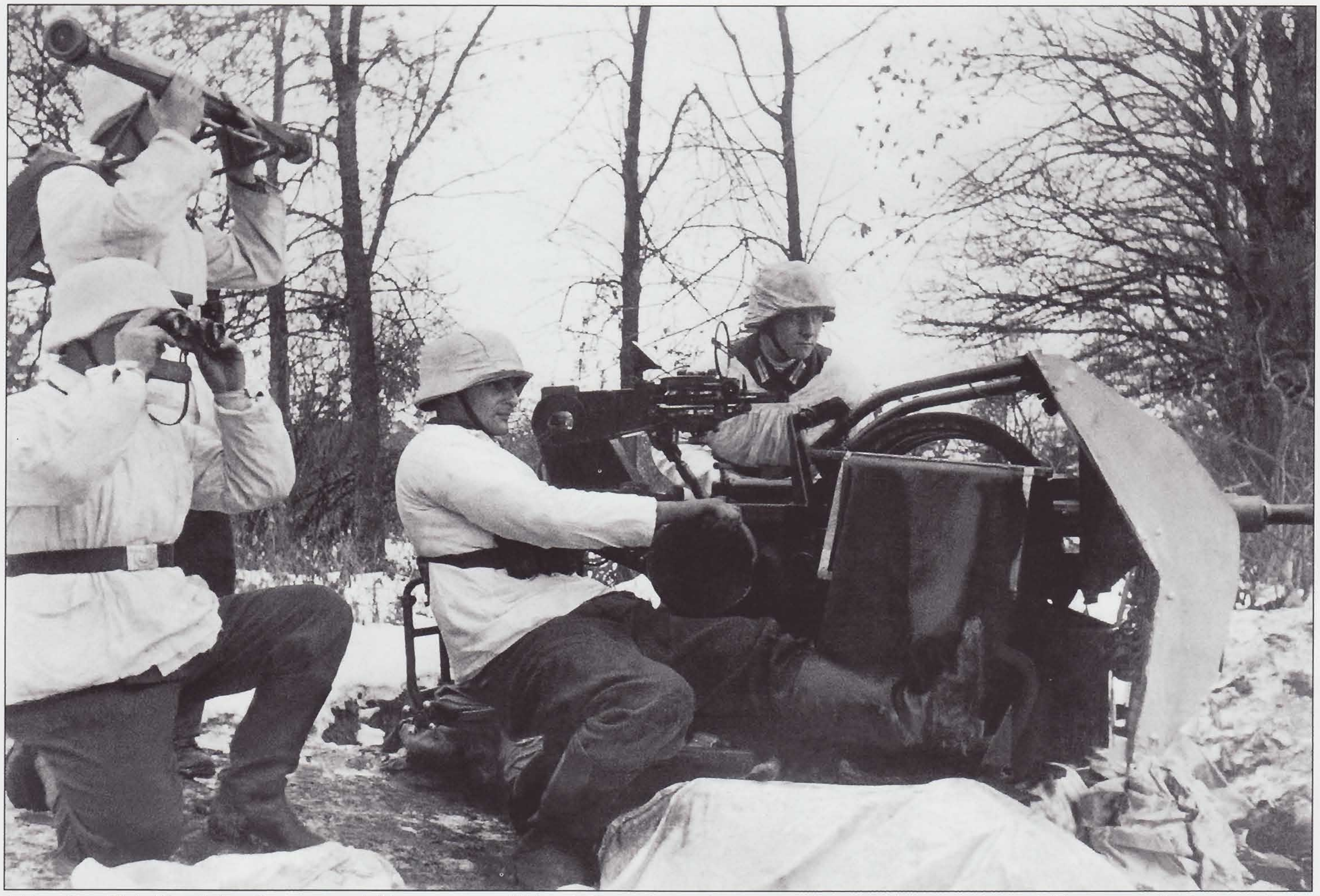


The crew moves an unidentified infantry gun to a new position. The crewman in the forefront has a heavy-duty hauling sling (Schleppriemen). These slings were broad brown leather or tan web bands fitted with a large carbine hook and an adjusting buckle. They were issued to the crews of antitank and infantry guns.

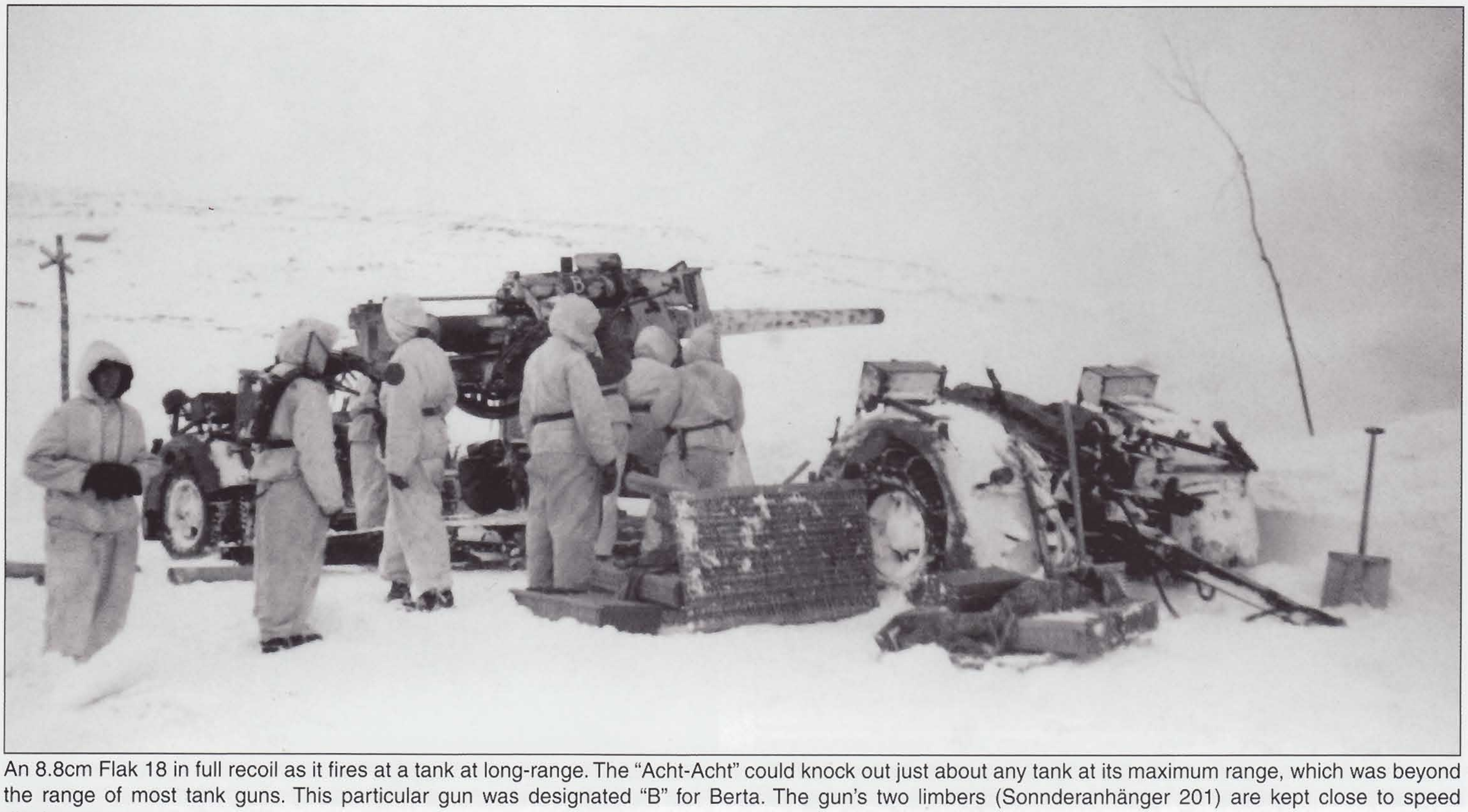
A popular company commander is laid to rest. A rifle company follows a light truck bearing the body of "the Father of the Company"—(der Vater der Kompanie).



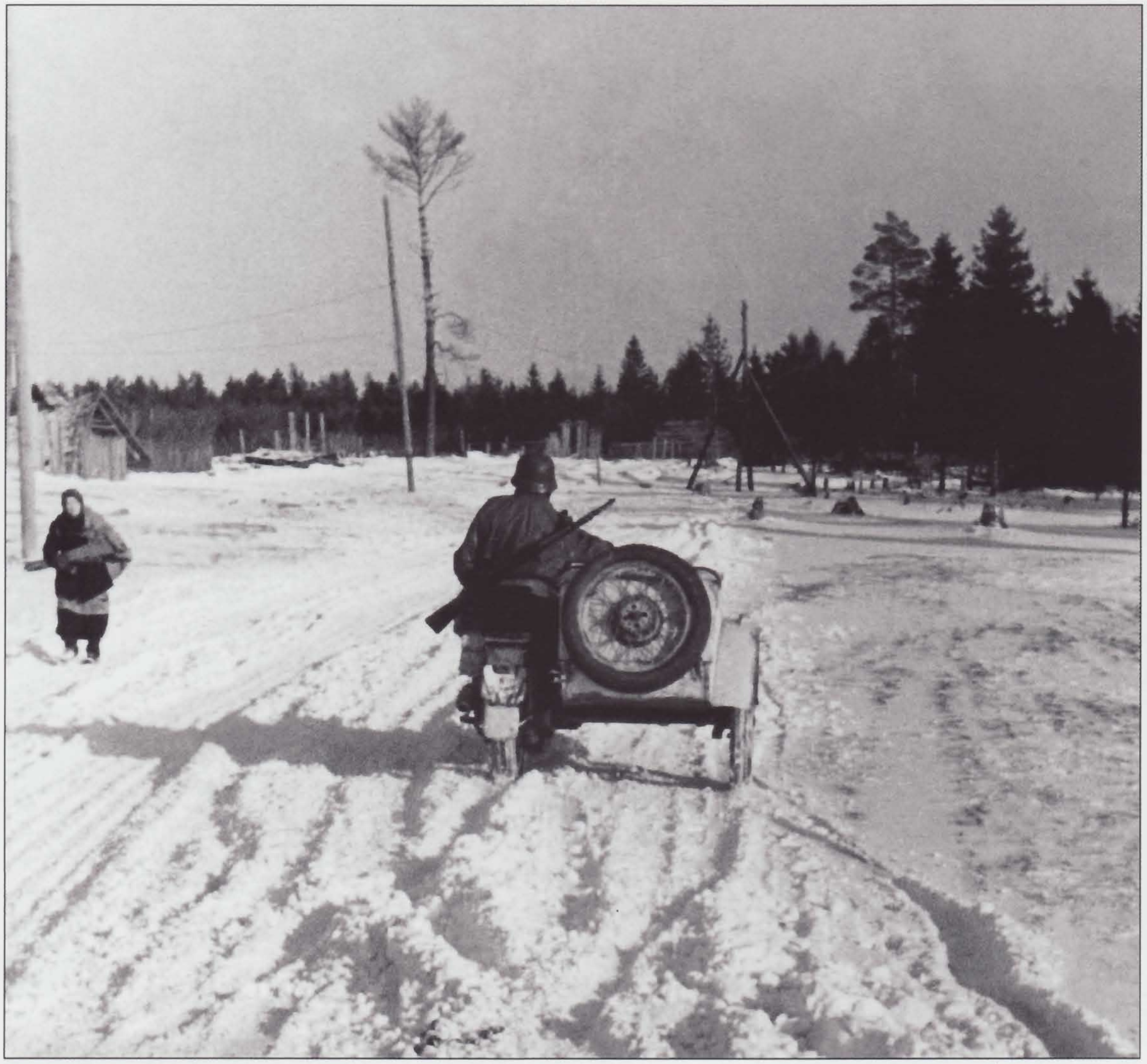
A mounted reconnaissance units moves out on patrol. Regardless of the importance of armor on the Eastern Front, horse cavalry was still valuable as it could negotiate forests, swamps, and steep rocky hills denied to tanks.



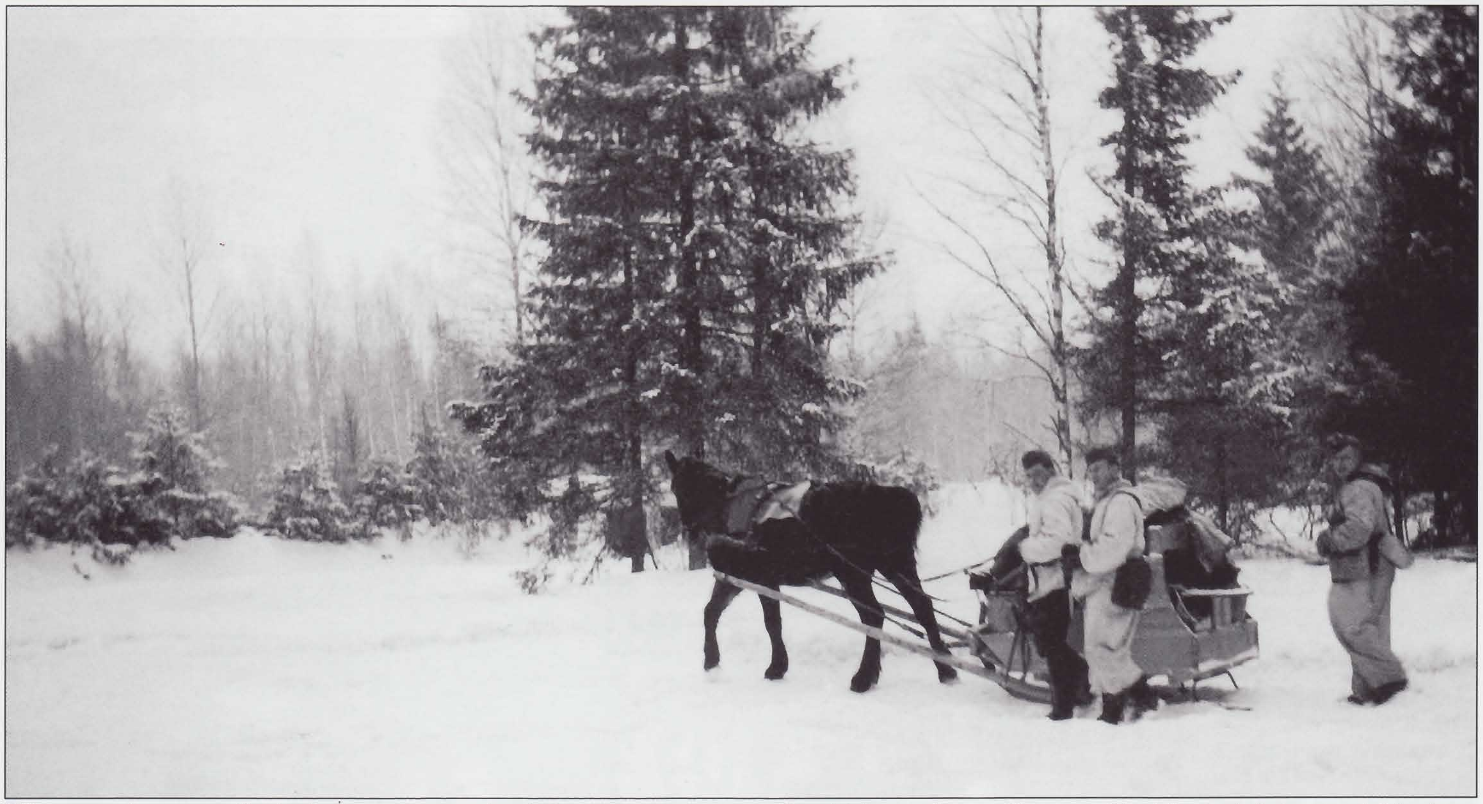
A Heer 2cm Flak 38 antiaircraft gun crew sights on a target. With a 450 round per minute rate of fire with high-explosive and firing armor-piercing rounds the 2cm Flak could inflict considerable damage on troops, light armored vehicles, and weapon positions. Due to the necessity of changing its 20-round magazine its practical rate of fire was 220 rounds per minute. Nonetheless it proved a valuable weapon for defending sectors thinly held by infantrymen. In the foreground can be seen its white camouflaging/protective tarpaulin.



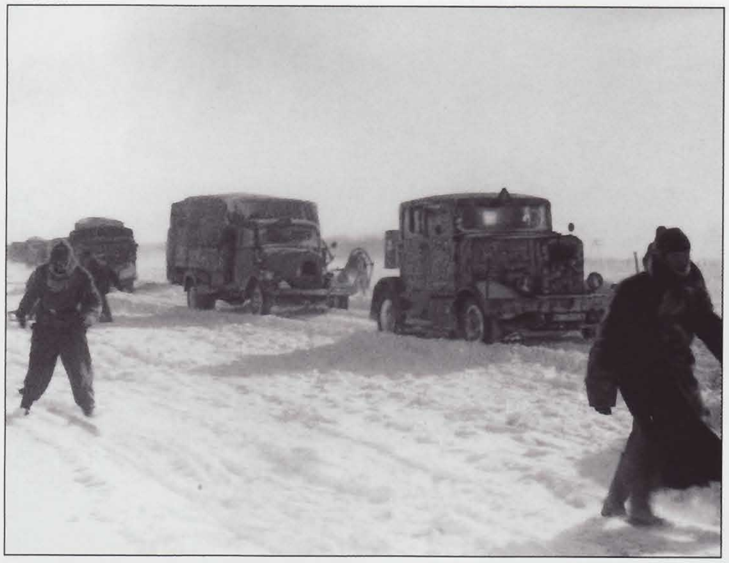
An 8.8cm Flak 18 in full recoil as it fires at a tank at long-range. The "Acht-Acht" could knock out just about any tank at its maximum range, which was beyond the range of most tank guns. This particular gun was designated "B" for Berta. The gun's two limbers (Sonnderanhänger 201) are kept close to speed displacement.



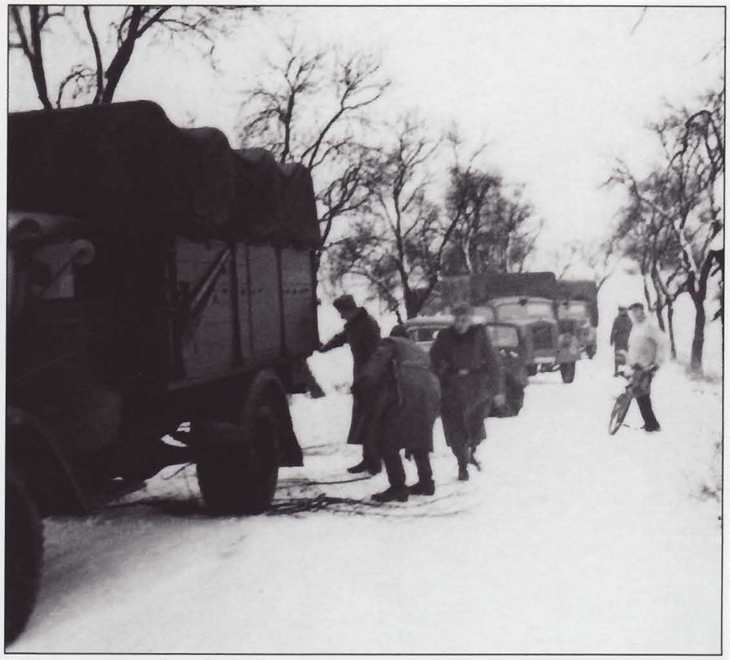
A combination motorcycle trundles down an icy road. The most valuable service provided by motorcycles (Krafträder), which the Landser simply called "Kräder", under these conditions was as couriers. The Germans employed a wide variety of motorcycles, including BMW, DKW, NSU, Triumph, Victoria, and Zündapp models.



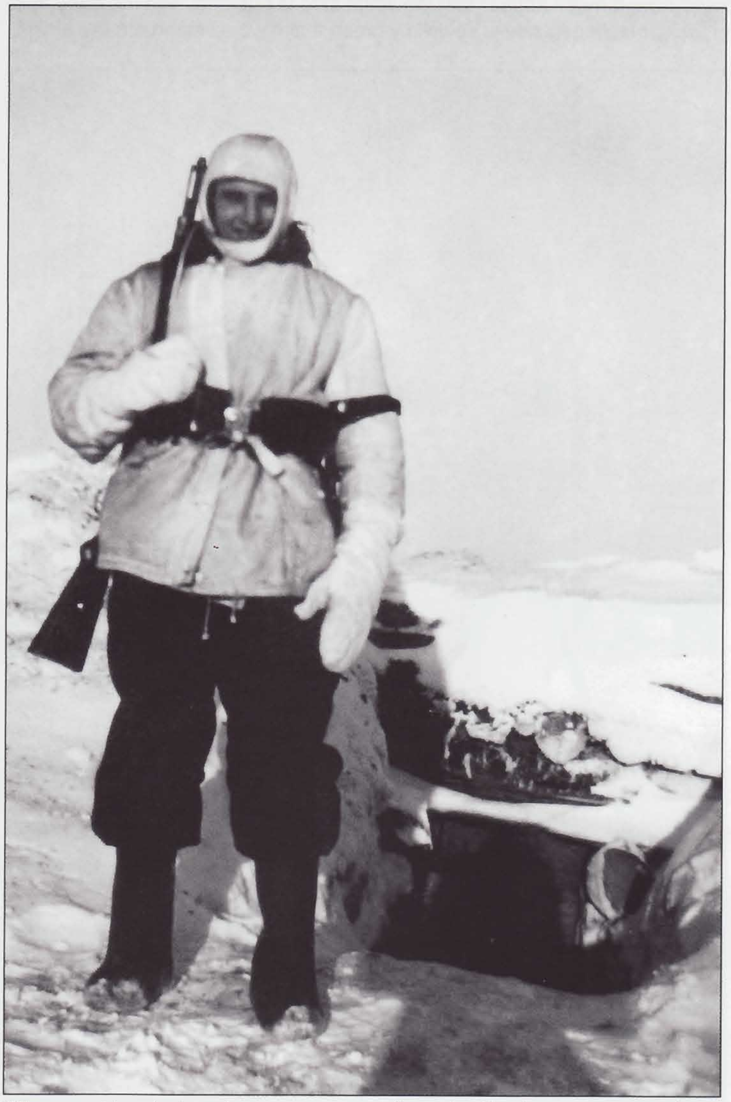
Rifle companies were authorized a few wagons and carts to carry reserve ammunition, basic supplies, and baggage. The latter included spare clothing bags and bedrolls so they would not have to be carried by the troops. On the Eastern Front the wagons and carts were replaced by sleds, often civilian models. At night the company train sent the bedrolls forward.



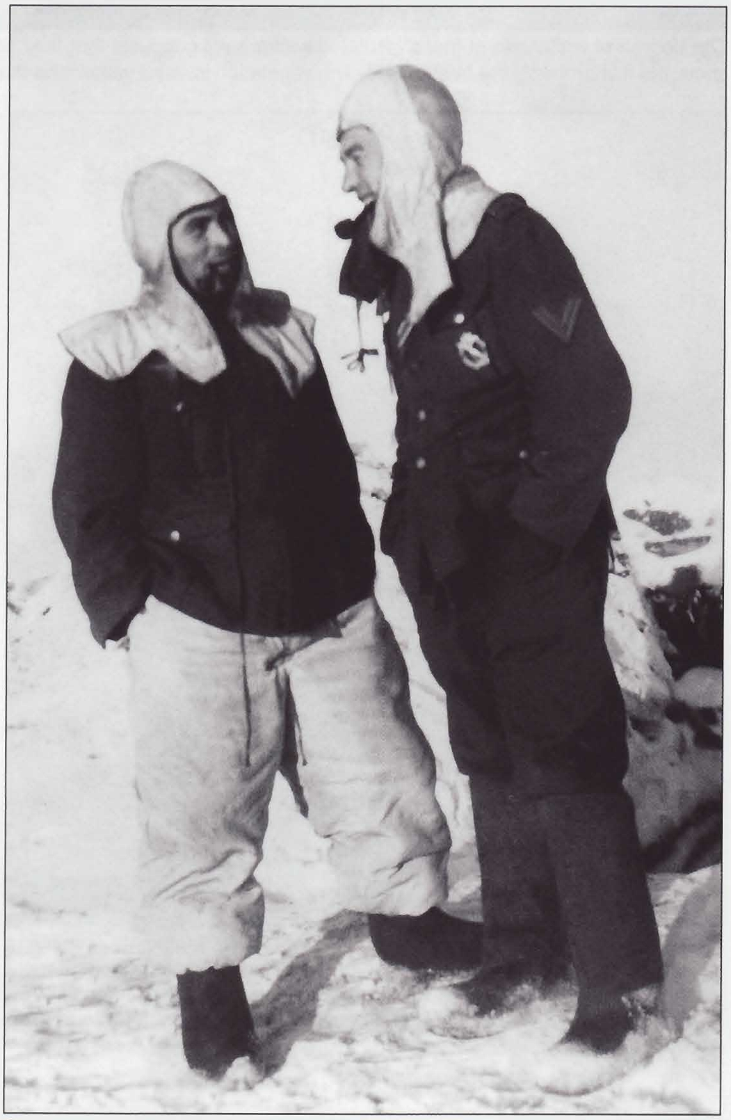
The winds often blew so hard that it was difficult for a man to stand or even trudge forward. Such winds often forewarned of a blinding blizzard.



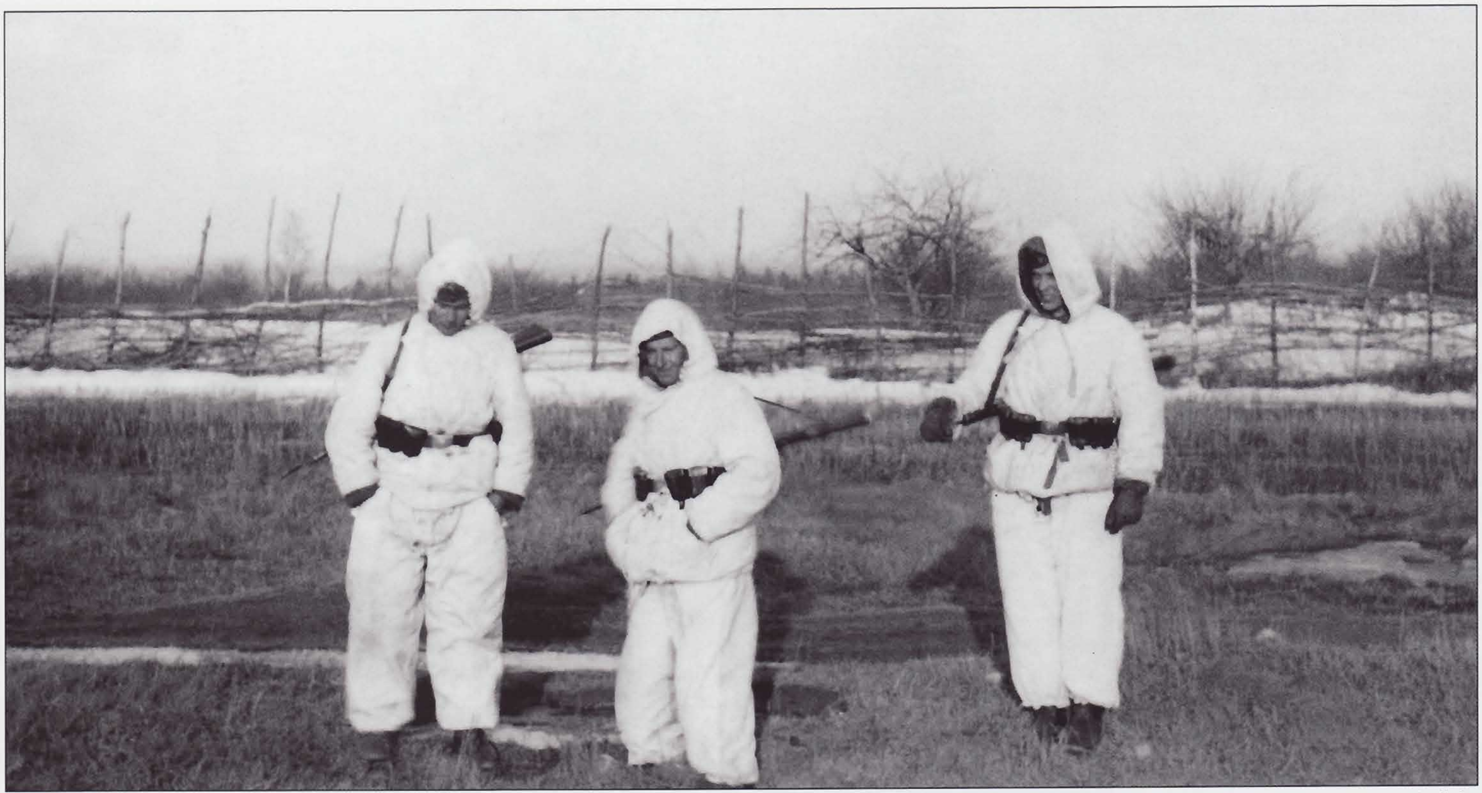
Without scarce tire chains icy patches caused trucks to lose traction. Tree limbs would have to be worked under tires to get trucks across even small ice patches.



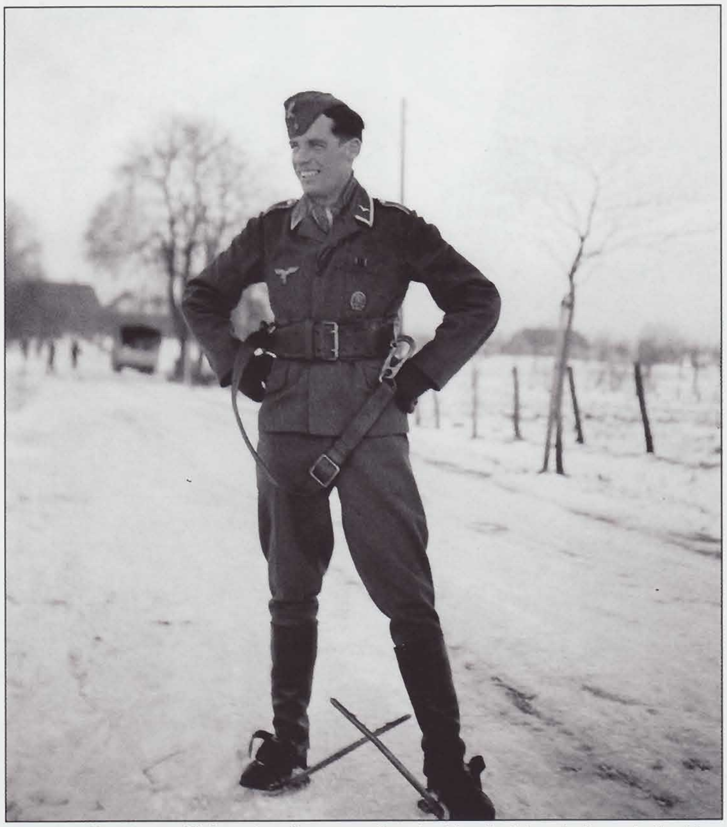
When working in trenches snow camouflage for the legs was sometimes considered unnecessary. Two-finger mittens, as worn here, had to be removed in order to fire a rifle.



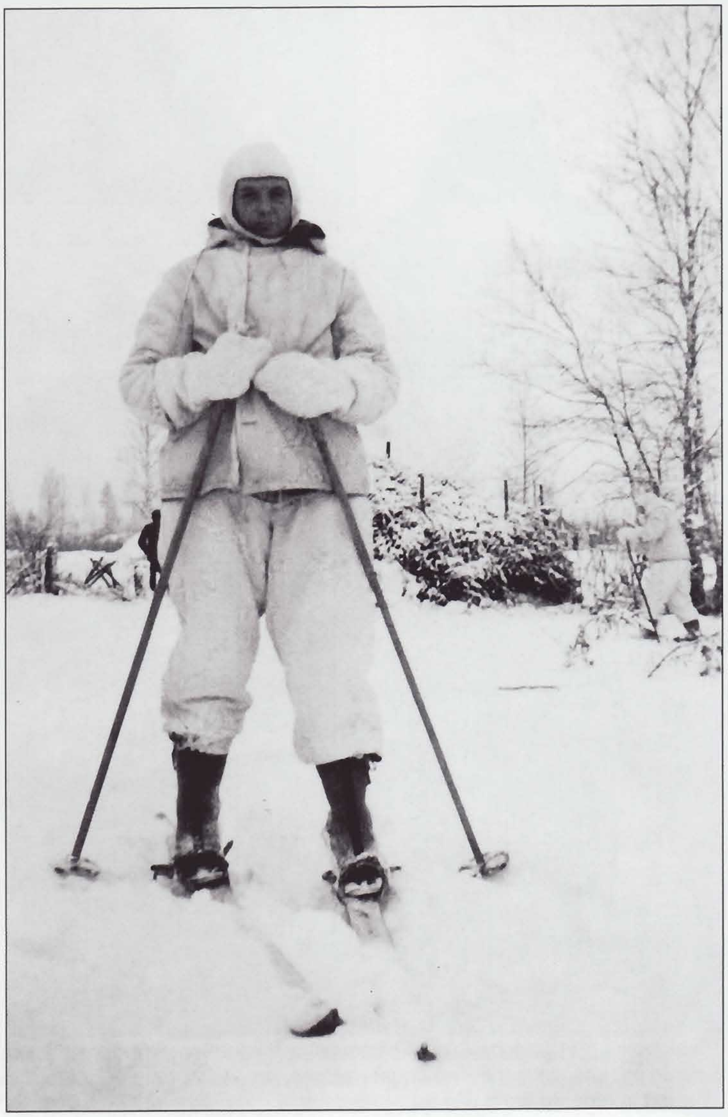
On a comparatively "mild" day two soldiers relax outside of their bunker. Many soldiers smoked pipes rather than cigarettes. Both wear felt boots. The Obergefreiter to the right wears an Infantry Assault Badge on his left breast pocket.



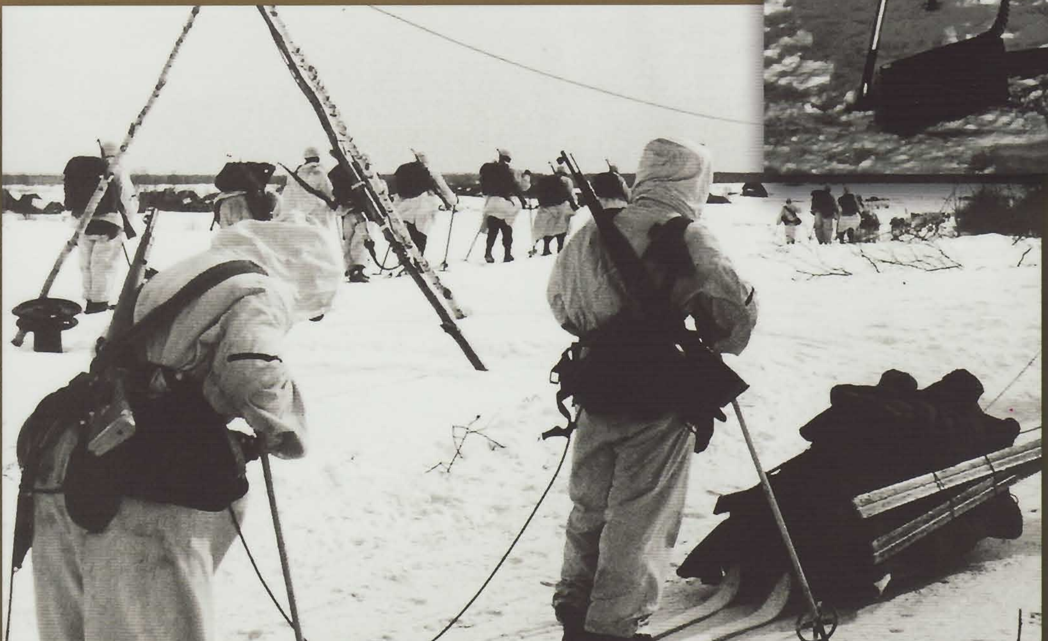
The degree of whiteness of these insulated winter suits suggests that they are brand new. It might appear that the white side is not ideal with the early light snow, but it is probably the best choice. The vegetation is dead yellow and tan and the camouflaged side is so vividly green that it would stand out like a sign.



A Luftwaffe Unteroffizier signalman outfitted with climbing belt and climbing spikes. These spikes have barbs on the upper inside edges, whereas most climbing spikes are very short. Luftwaffe signals troops wore gold brown Waffenfarbe as opposed to the lemon yellow used by Army and Waffen-SS signallers.



A ski soldier outfitted in the reversible insulated winter suit with his hood down exposing the close-fitting skull cap. This suit proved to be extremely popular and contributed to saving many lives and protecting millions from frostbite.



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PUBLICATIONS COMPANY

ISBN 962-361-152-8

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